FEBRUARY 1954

The Paper Industry

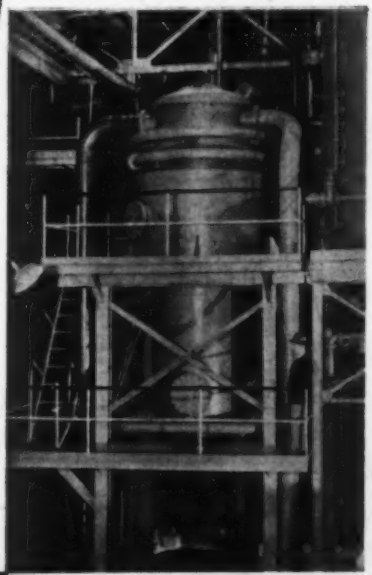
PUBLIC LIBRARY
FEB 16 1954
DETROIT

Count on Lifetime Engineering Service

WHEN YOU USE SWENSON DIGESTER BLOW CONDENSERS

You can't buy this kind of engineering service . . . but it's yours for the asking when a Swenson engineered Digester Blow Condenser is part of your plant operation. A qualified Swenson engineer is always at your disposal . . . a man who possesses the technical know-how and the ability to assist you in obtaining *maximum* heat recovery and *optimum* water temperatures. So ask for experienced Swenson engineering in the *planning* stages and be assured of *continuous* competent service for the entire *lifetime* of the equipment.

SWENSON EVAPORATOR CO.
15653 Lathrop Avenue, Harvey, Illinois



SWENSON

Proved Engineering for the Process Industries
SINCE 1889

A Division of WHITING Corporation

Pulp Washers • Evaporators
Filters • Digester Blow Condensers
Turpentine Condensers

Asten DRYER FELTS

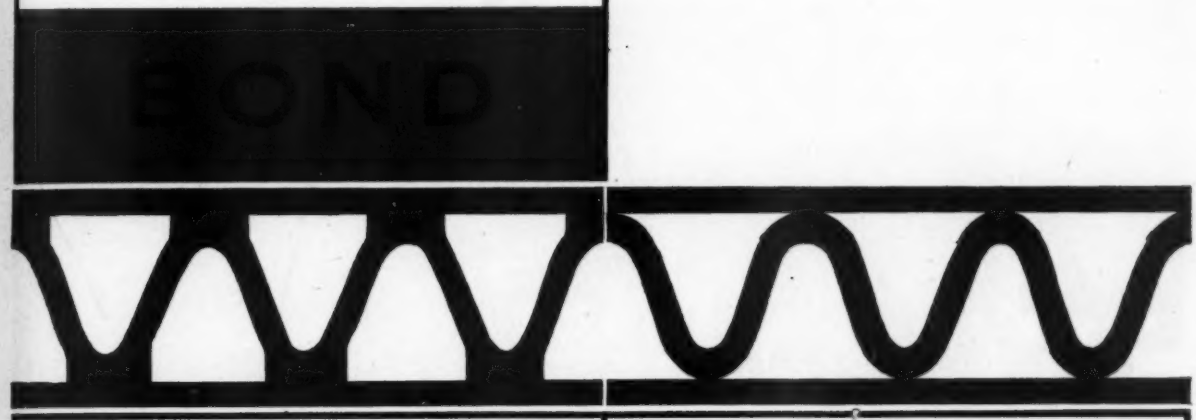
Chasing the mechanical "bunny" is like trying to make a dryer felt that will equal the performance of an ASTEN made with infinite care for individual grade and mill conditions.

Economy in the long run

ASTEN-HILL MFG. CO.
PHILADELPHIA, PENNA.

ASTEN-HILL LIMITED
VALLEYFIELD, QUEBEC

GEL POINT control insures good adhesive



GOOD BOND

This graphic illustration shows how bond is improved if penetration is controlled with the inclusion of a fraction of a percent of Kelsize in the starch adhesive formula. Retention of water and water soluble chemicals in correct proportion with raw starch at the glue line is essential for proper gelatinization of the raw starch mixture.

POOR BOND

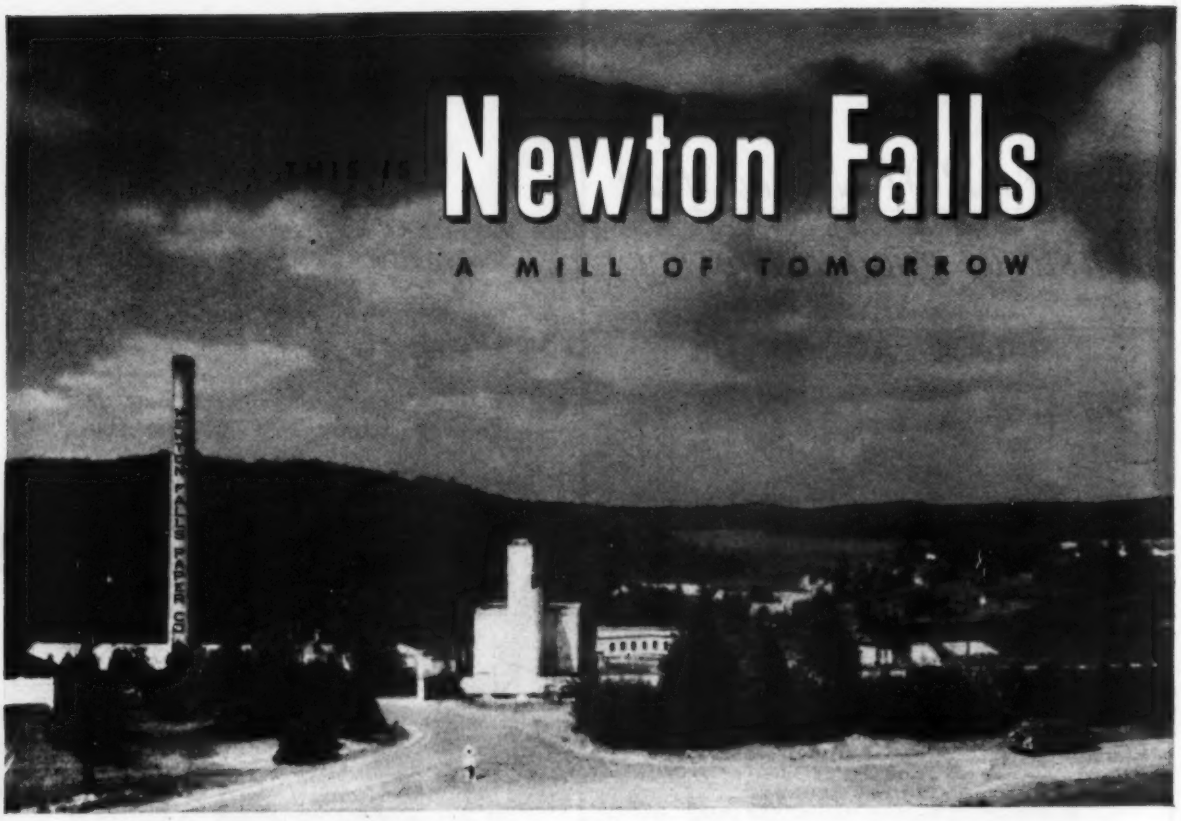
The above illustration shows how the moisture of the adhesive tends to migrate into the medium, leaving an unbalanced starch mixture at the glue line. Poor bond will result if the moisture of the starch paste soaks into the liners and medium before heat is applied and gel point reached.

Precisely engineered for specific uses, Kelco algin products are manufactured to absolutely uniform standards by the Kelco control procedure, which includes 46 distinct tests.

To insure best possible bond, call our nearest regional office for a free demonstration of Kelsize by one of our experienced paper technical men.

KELSIZE®... *a product of* **KELCO** *company*

31 Nassau Street, New York 5, N. Y.
20 N. Wacker Drive, Chicago 6, Ill.
530 W. Sixth Street, Los Angeles 14, Calif.
Cable Address: Kelcoalgin — New York



. . . using *Nalco* SPECIALIZED CHEMICAL SERVICES

Newton Falls Paper Mill, Incorporated, Newton Falls, New York, has earned the title of A Mill of Tomorrow through use of highly advanced equipment and very precise quality control at all stages of the papermaking process.

Nalco Specialized Chemical Services used at Newton Falls tie in closely with this quality control program. They include Nalco slime control and antifoam chemicals, fed accurately and automatically to the system; and Nalco 680 for better fibre and clay retention and improved pH control.

For prompt, expert assistance in applying these, and other Nalco System products and services to your mill operation, contact your Nalco Representative or write direct.

Foam bubbles eliminated on wire and in tray discharge by Nalco antifoam treatment at Newton Falls.

NATIONAL ALUMINATE CORPORATION
6232 West 66th Place • Chicago 38, Illinois
In Canada: Alchem Limited, Burlington, Ontario

THE *Nalco*® SYSTEM...Serving the Paper Industry through Practical Applied Science

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 35 • NUMBER 11 • FEBRUARY, 1954

Features . . .

Are we understaffed at the technical and planning level? 1187

New pulp mill integrated into Weyerhaeuser's operations 1204
by K. F. Harris

Paper and wood — a new team 1209
by J. A. Hall

Problems affecting the wider use of wood as a technical raw material 1213
by Harry F. Lewis

Centrifugal pumps — Part 30 1215
by Igor J. Karassik and Roy Carter

Are older workers efficient? 1217
by W. Schweisheimer

Motorized industrial truck applications 1218
by Wilbur G. Hudson

Maintenance procedures in a paper mill 1220
by Irving M. Witham

Crane with cradles speeds pulpwood operations 1222

Rayonier's new Georgia plant nears completion 1193

New grinder room in operation at Fort Frances mill 1195

Expansions maintain rapid pace 1195

News . . .

News of the Industry 1193

Allied News 1224

Association News 1230

Names in the News 1232

Necrology 1237

Departments . . .

Editorial 1187

Current Comment 1189

Financial Reports 1189

Paper Sketches 1223

Coming Events 1231

Patent Reviews 1238

Foreign Abstracts 1241

New Products 1244

New Literature 1250

Current Market Quotations 1254

Index to Advertisers 1256

Published monthly by:
FRITZ PUBLICATIONS, INC.
Edward B. Fritz (1869-1939), Founder

Publication Staff:

President and General Manager
A. SCOTT DOWD

Vice President and Treasurer
A. C. L. FRITZ

Secretary
A. C. BRUCE

Editorial Director
A. W. J. DYCK, Ph.D.

News Editor
D. W. ZEIGLER

Editorial Assistant
CAROL M. JOHNSON

Sales Manager
R. M. McFARLAND

Production Manager
EDGAR C. FARREN

Circulation Manager
STANLEY E. BOIE

Advertising Representatives:

BOSTON 16: **Meade & Company,** 471 Statler Building, Liberty 2-9677.

CHICAGO 5: **John D. Henderson,** 431 South Dearborn Street, Wabash 2-3543.

CLEVELAND: **Charles E. Dowd,** 431 South Dearborn Street, Chicago 5, Illinois. Wabash 2-3543.

LOS ANGELES: **Murray Bothwell,** 234 East Colorado St., Pasadena, Calif., Ryan 1-9155.

NEW YORK 20: **L. S. van Nydeck,** 9 Rockefeller Plaza, Circle 7-3085.

NEW YORK 25: **Harry A. Johnston,** 945 West End Avenue, Academy 2-6984.

PORTLAND: **Murray Bothwell,** 234 East Colorado St., Pasadena, Calif., Ryan 1-9155.

SAN FRANCISCO: **Murray Bothwell,** 234 East Colorado St., Pasadena, Calif., Ryan 1-9155.

THE PAPER INDUSTRY—founded in 1919—known as "The Paper Industry and Paper World" from June, 1939, through December, 1949, assumed its original title with the January, 1950, issue.

Published at 1501 Washington Road, Mendota, Illinois.

Address all correspondence intended for publication to Editorial and Executive Office, 431 South Dearborn Street, Chicago 5, Illinois.

Member: Audit Bureau of Circulations, The Associated Business Publications.

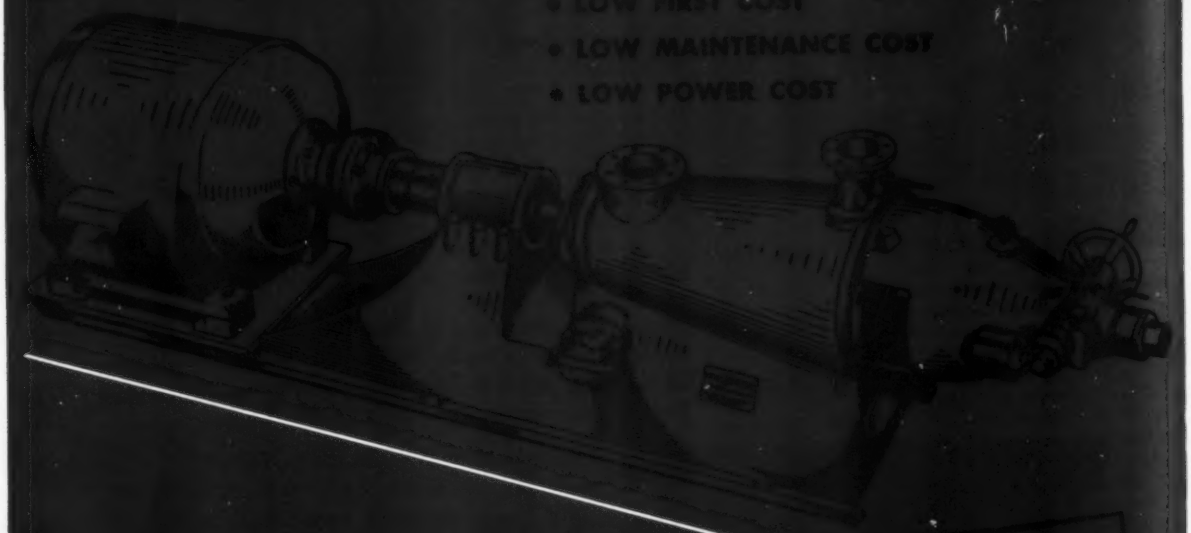
Application pending for entry as second class matter at the post office at Mendota, Illinois, under the Act of March 3, 1879.

Subscription rates: United States, U. S. Possessions, and Canada, $3.00 for one year, $5.00 for two years, $6.00 for three years. All other countries, $8.00 for one year, $18.00 for three years, payable in advance in U. S. Funds.

The PAPER INDUSTRY is indexed regularly in **Engineering Index** and **Industrial Arts Index.** An index to each volume is issued annually by the publisher as a part of the April number. Copyright 1954, by Fritz Publications, Inc.

the great new E.D. Jones STOCKMASTER

- LOW FIRST COST
- LOW MAINTENANCE COST
- LOW POWER COST



COMPARATIVE TEST: BARKSACHIES DOUGLAS FIR KRAFT

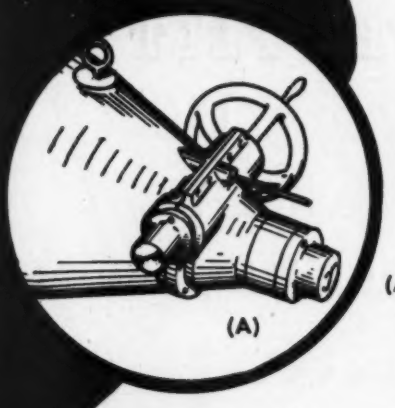
		Refiner 870 R.P.M.
Speed		1.96
Pulp Quality After Application of [illegible]	2.20	325
Fibre Length — MM*	250	6300
Freeness — CC CS	7000	37
Breaking Length — MM	45	144
Burst — Metric	182	
Tear Factor		
[illegible]ility-At 400 CC CS Freeness	2.32	2.05
Fibre Length — MM*	410	550
Power Required — HP Hrs. Per Ton	6100	5800
Breaking Length — MM	42	36
Burst — Metric	218	172
Tear Factor		

*Raw Fibre Length — 2.73 MM

LOOK AT THE RECORD

Here's a comparison of the results achieved on the same stock under the same conditions by the STOCKMASTER and a competitive "beater" type refiner.

for superior continuous beating

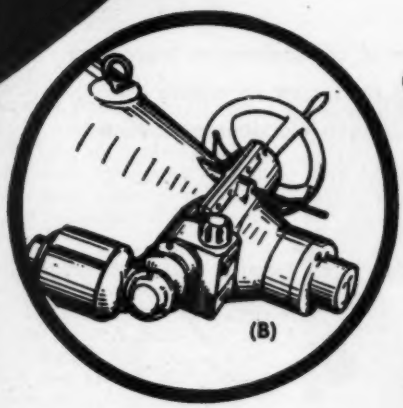


Here's a great new conical refiner — the JONES STOCKMASTER® with range, flexibility, control and *results* to meet your every need.

The wide selection of tackle available, plus precise control of rotor — combined with suitable stock flow, consistency and stock pressure — give the operator a truly flexible and controllable refining machine. The results produced are superior to other types of beating and refining equipment.*

Low in first cost, the STOCKMASTER is simple and economical to operate and maintain. And JONES engineering guarantees many years of trouble-free, dependable and efficient performance.

(A) Standard adjusting mechanism — 10" hand wheel with worm and worm gear reduction — permits very accurate adjustment of plug position and absorbed horsepower. It is a simple matter to add necessary gear motor and parts to change over to ACCRU-SET control at a later date.



(B) ACCRU-SET® Control — At modest extra cost, the basic mechanism shown above can be fitted with a gear motor for any desired type of control, from a simple push-button arrangement for remote control to full automatic control of applied power with indicating or recording, current-sensitive or watt-sensitive instruments.

And ask your Jones representative about application of ACCRU-SET to your present refiners.

Ask your Jones representative or write direct today for our Bulletin 1047, giving specifications and full details.

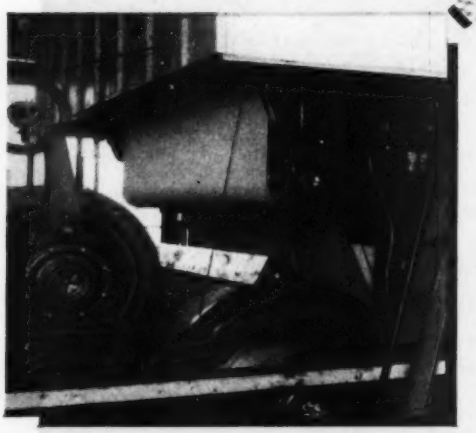
E.D. Jones

E. D. JONES & SONS COMPANY
PITTSFIELD, MASSACHUSETTS

BUILDERS OF QUALITY STOCK PREPARATION MACHINERY

SCIENTIFIC CONSTRUCTION* Makes The Big Difference In DRYER FELTS

WOODBERRY 887 REINFORCED DRYER FELT GIVES YOU SCIENTIFIC CONSTRUCTION



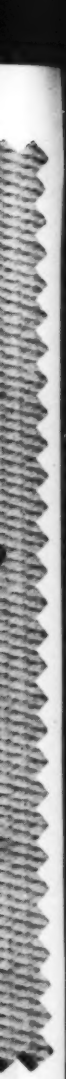
One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products. Here fabric thickness after weaving is being gauged.

*Asbestos yarns woven into the face of patented Woodberry 887 dryer felts at scientifically determined intervals give you longer wear and smoother operation. Paper mills have learned to count on lowered steam consumption and consistent quality with Woodberry 887. For dryer felts that are low on cost, high on performance, specify Woodberry 887.

Mt. Vernon-Woodberry Mills

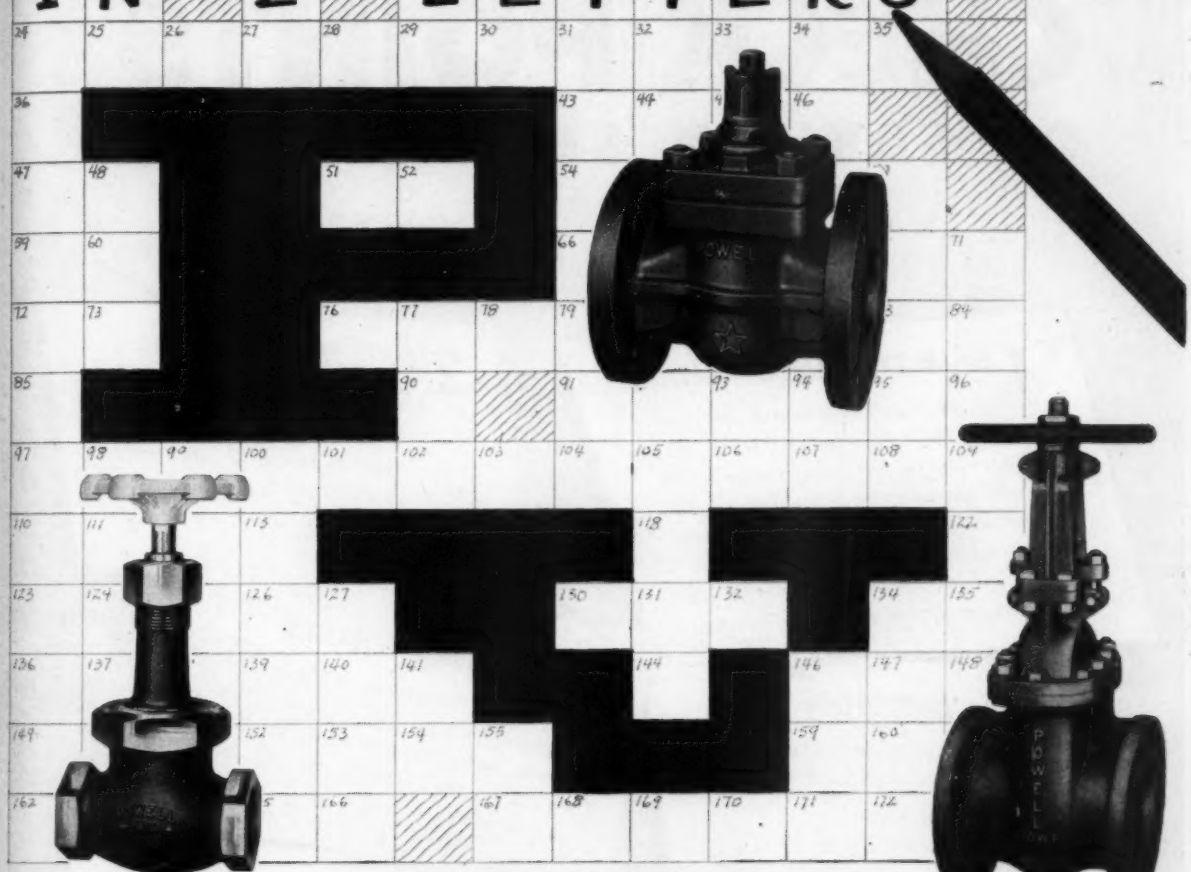
Branch Offices: Chicago • Atlanta
Baltimore • Boston • Los Angeles

TURNER HALSEY COMPANY
Selling Agents
40 WORTH ST NEW YORK



, 1954

DEPENDABILITY IN 2 LETTERS



TOP

LUBRICATED PLUG VALVE *(Fig. 2201)* Flanged end. Screwed or bolted glands. Semi-Steel valves available for 175 and 200 pounds W.O.G. Carbon Steel Valves available for 150 and 300 pounds W.P.

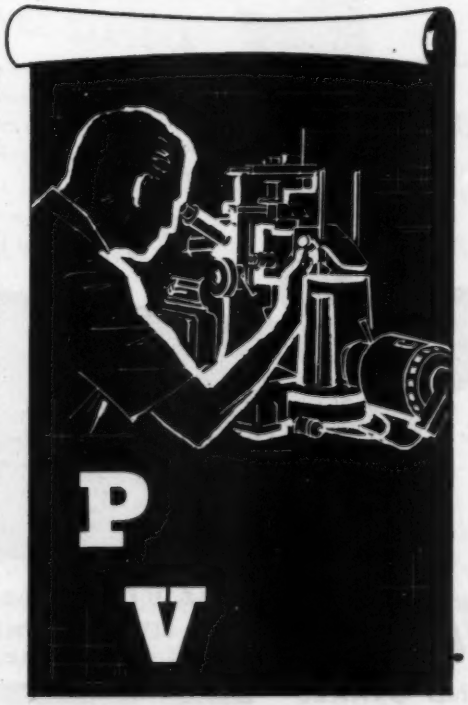
LEFT

BRONZE "W.S." FULL FLOW GLOBE VALVE *(Fig. 2608)* For 200 pounds W.P. Regrindable, renewable, hardened stainless steel seat and disc. Nominal pipe size opening through seat permits fuller flow—cuts turbulence, pressure drop to minimum. Sizes ⅛" to 3", inclusive.

RIGHT

STAINLESS STEEL O.S. & Y. GATE VALVE *(Fig. 2453-G)* For 150 pounds W.P. at 500 F. Interchangeable solid or split wedges are precision fitted and accurately guided throughout entire travel. Sizes 2½" to 4", one-piece yoke: 5" to 30", separable yoke arms.

These valves are available in a wide selection of corrosion resistant metals and alloys.



The life of a valve bears a certain relation to the life of the company that produces it. Powell has had a solid, oak-like growth for over a hundred years. That's only possible because The William Powell Company makes dependable valves.

Today, Powell Valves are proving their dependability in a greater variety of installations than any other valves in the world. And Powell is very likely the leader in research as well as development of special valves to overcome flow control problem situations.

All good reasons why PV, for Powell Valves, appears on more specifications year after year.

THE WILLIAM POWELL COMPANY
CINCINNATI 22, OHIO

CONTROLS FOR THE LIFE LINES OF INDUSTRY

..... 108th YEAR

When Choosing Clutches and Brakes for Your Equipment, Look Over These

CHECK POINTS OF FAWICK SUPERIORITY

In selecting clutches and brakes for your machinery, Fawick is your logical choice. Check these six points of Fawick superiority.

1 DRUM-TYPE AIR OPERATION

Fawick clutch and brake units provide a 360° friction surface and uniform-pressure, constant-velocity contact between the full width of the friction shoes and the drum. Greatest operating torque results from the application of operating pressure at the maximum diameter.

2 OPTIONAL CONTROL

Local or remote finger-tip control of instantaneous and smooth starting and stopping increases operating efficiency. Clutch or brake action can be sensitively regulated while units are in operation.

3 SELF-ADJUSTING

The rugged Fawick actuating element automatically compensates for wear of friction shoes. This insures complete engagement and dependable service from Fawick clutches and brakes.

4 LOW MAINTENANCE

Even friction-shoe wear reduces lost production time for clutch or brake maintenance. After long periods of satisfactory service, only the friction shoes need be replaced.

5 NO LUBRICATION

Fawick design and construction eliminate the problem of clutch or brake lubrication.

6 SPACE-SAVING

Space requirements for Fawick installations are minimized due to the small number of moving parts and elimination of mechanical linkages. All conventional mounting arrangements are made with a substantial saving of vital axial space.

FAWICK Airflex

INDUSTRIAL CLUTCHES AND BRAKES

FAWICK AIRFLEX DIVISION
FEDERAL FAWICK CORPORATION
9919 CLINTON ROAD • CLEVELAND 11, OHIO

What Mr. Tubes Can Do For You

—about stainless piping

Because of his extensive knowledge of stainless and stainless applications, he can offer dependable help when you want to select the *best* grade and size to match the metal to end use specifications. His day-to-day concern with stainless piping problems provides a vast reservoir of experience on which you may draw to meet your own specific requirements.

Mr. Tubes symbolizes the complete technical service enjoyed by users of B&W tubular products—available to you through B&W's headquarters technical staff, helpful regional representatives, and B&W's nationwide network of friendly, efficient distributors.

THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

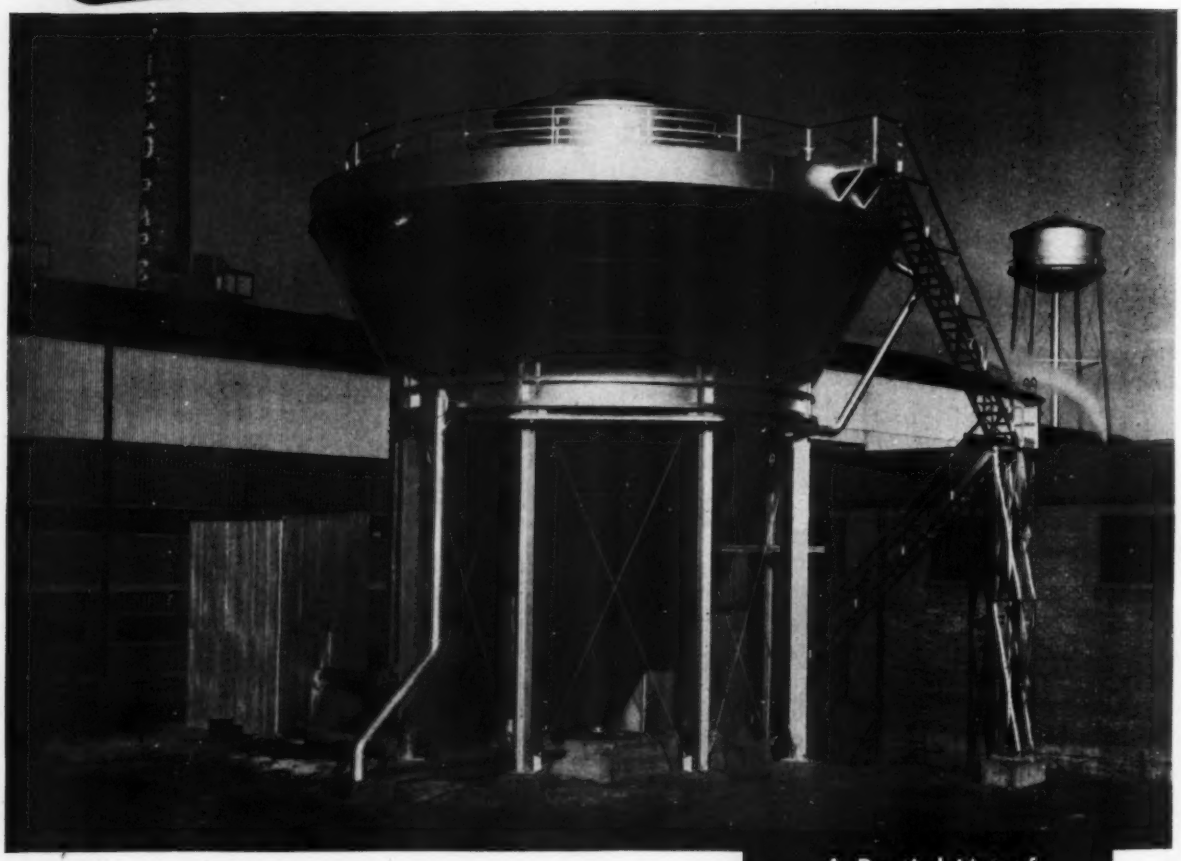
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

B&W SEAMLESS and WELDED TUBES

TA-1801 (SWP)

The MARX SAVEALL

for the efficient recovery of waste fibers from whitewater



Reduce your operating costs by using the Marx Saveall — a large settling unit that reclaims lost pulp fibers from whitewater. In addition to reclaiming the valuable solids, Marx Saveall processing permits the reuse of whitewater and helps prevent stream pollution when paper machine effluent is not reused.

Write our nearest office for information, estimates or quotations on the Marx Saveall, or any other type of welded steel plate structures for the pulp and paper industry. There is no obligation on your part.

A Partial List of Other Horton Equipment

ACCUMULATORS
DIFFUSERS
DIGESTERS
PULP WASHING TANKS
SETTLING TANKS
STORAGE TANKS

CHICAGO BRIDGE & IRON COMPANY

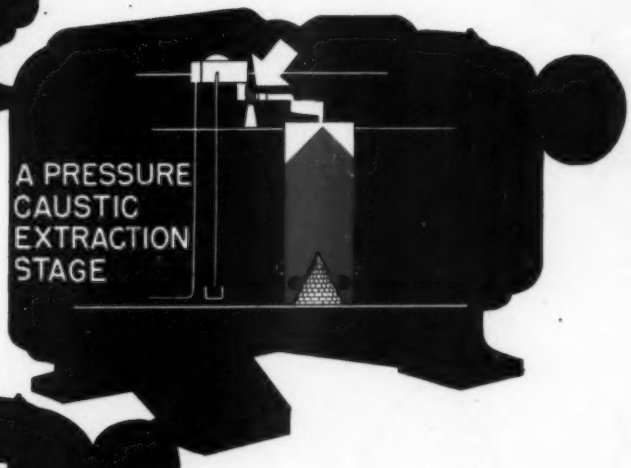
Atlanta, 3.....2143 Healey Building
Birmingham, 1.....1511 North 50th Street
Boston, 10.....1026—201 Devonshire Street
Chicago, 4.....2445 McCormick Building
Cleveland, 15.....2267 Midland Building
Detroit, 26.....1566 Lafayette Building
Houston, 2.....2143 C & I Life Building
Los Angeles, 17.....1559 General Petroleum Building
New York, 6.....3350—165 Broadway Building
Philadelphia, 3....1653—1700 Walnut Street Building
Pittsburgh, 19.....3231 Alcoa Building
Salt Lake City, 4.....527 West 17th South Street
San Francisco, 4.....1547—200 Bush Street
Seattle, 1.....1327 Henry Building
Tulsa, 3.....1651 Hunt Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA.

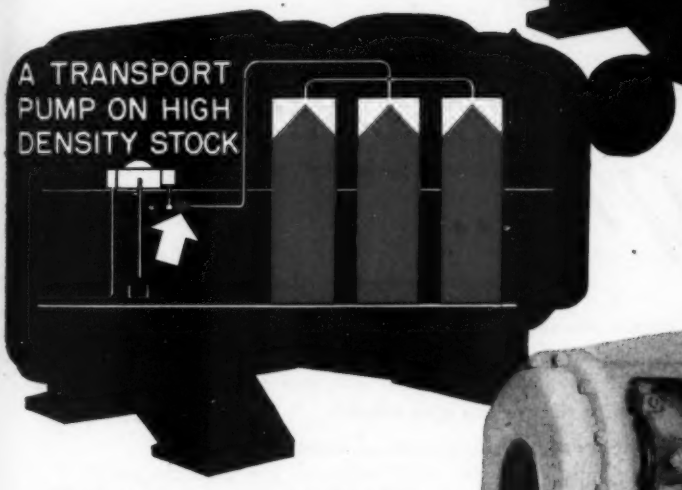
In Canada: HORTON STEEL WORKS LIMITED, FORT ERIE, ONT.

THICK STOCK PUMP

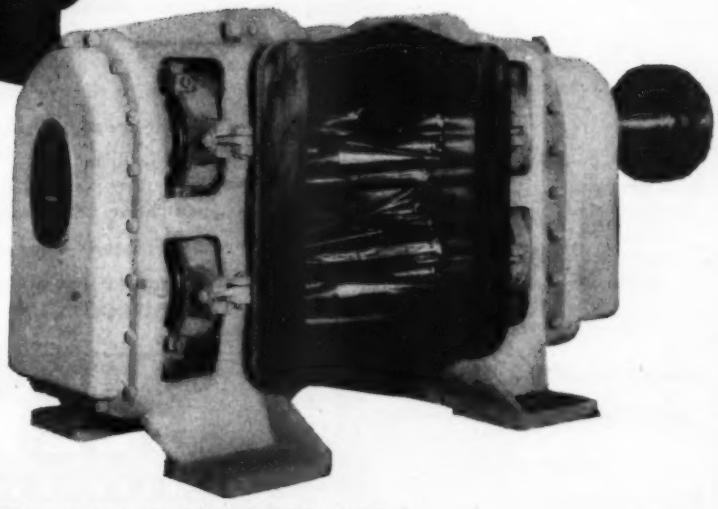
PUMPING 10%-17% PULP



IMPCO



SERIES - 300 *
SERIES - 500 *



This unit is a positive displacement type pump specifically designed to handle pulps at high densities. The conical profile of its synchronous rotors permits the pumping of stock at densities above 10% A.D. —with lowest horsepower per ton —and no fibre damage. Truly the modern way to handle all types of pulp.

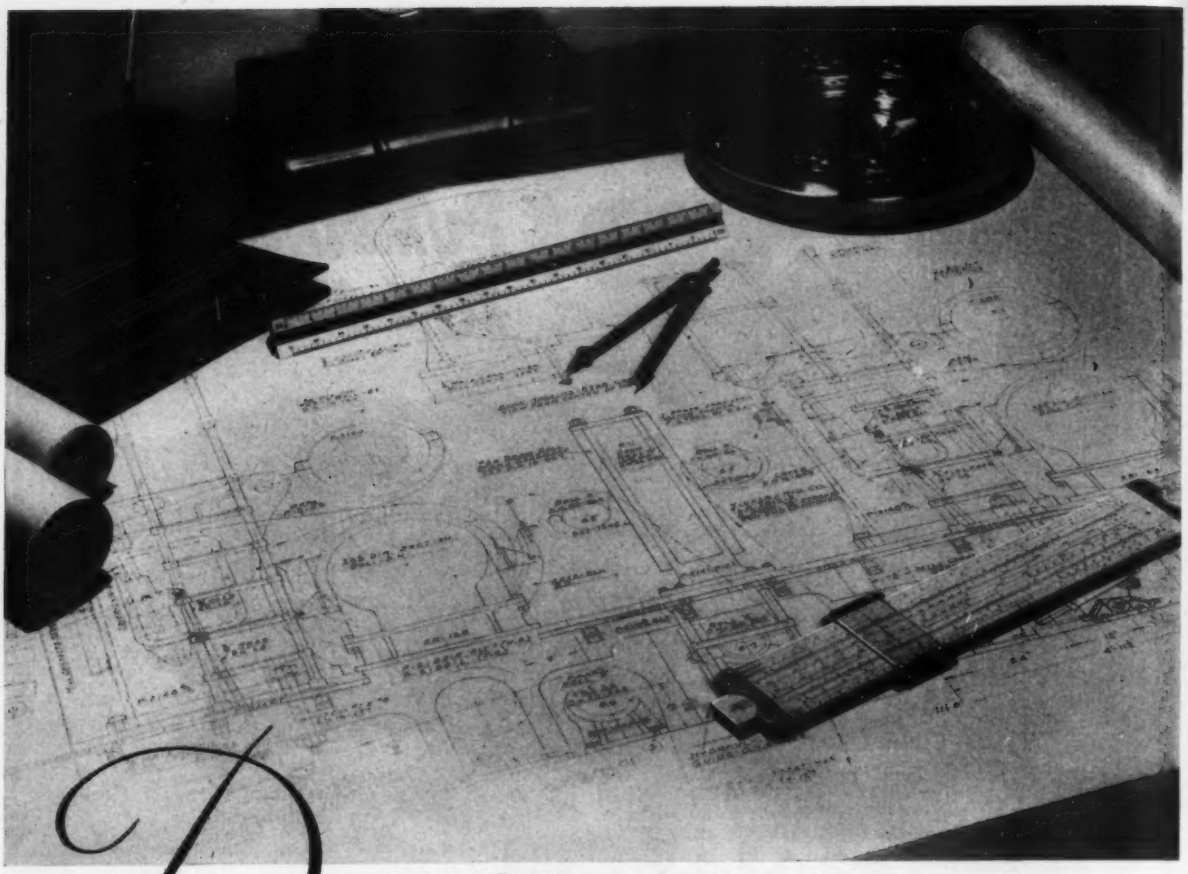
***Tons per day**

IMPROVED MACHINERY INC.

J-35

NASHUA, NEW HAMPSHIRE

Sherbrooke Machineries Limited manufacture similar equipment in Canada



Design...

Designing the paper machine is important from every angle in that the economic life value of the mill is involved.

A paper machine of superior design can give reliable performance and flexibility for present requirements or conditions and yet provide for future requirements.

An early consultation with us can be to your advantage for your paper making machinery needs — for designs that are outstanding with features of performance that are years-ahead.

designers and builders of paper making machinery
Since 1853

BAGLEY & SEWALL

WATERTOWN • NEW YORK

Foreign Representative: **CASTLE AND OVERTON, INC., 630 Fifth Avenue, New York 20, New York**
West Coast Representative: **DAN CHARLES AGENCY, 1331 Third Avenue, Seattle 1, Washington**
Finland Representative: **AKTIEBOLAGET EKSTROMS MASKINAFFAR, Helsingfors, Finland**

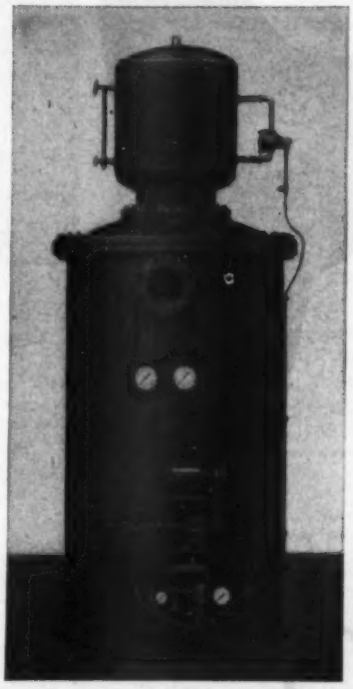
CLEAN PAPER GETS THE PRICE

ADAMS WATER FILTRATION GETS THE DIRT

ADAMS
PORO-STONE
FILTERS
for use with filter aid

where water from settling pond or crude filter needs polishing to remove all solids.

Complete package installation with filter aid facilities and built-in backwashing features.



ADAMS
PORO-STONE
FILTER
for automatic filtration

where turbid water must be cleared of all solids larger than 0.0005".

In kraft or tissue, book or newsprint — water quality is as critical as chip quality. No matter what grade of pulp or paper you make, sand, grit and pipe scale are expensive when they keep your product out of the top price brackets.

Water filtration with the Adams Poro-Screen or Poro-Stone Filter takes out price-lowering impurities *before* they become part of the stock. Thorough backwashing effectively prevents clogging of filter elements — avoids costly, cumbersome cleaning operations.

Remember — in its early stages your product is about 98% water, and most water-borne impurities stay with the stock.

Write for literature and sample specifications.

R. P. ADAMS CO., INC. 238 EAST PARK DRIVE, BUFFALO 17, N. Y.

No birds' eyes in your rag bond when it's made with

ARMOUR CHROME HIDE GLUE!

New drying methods insure that Armour's new "gelatine" type clear chrome hide glue is free from foreign materials. This improved product contains no free grease to cause "birds' eyes" in rag bond sized with it. Armour clear chrome hide glue produces a strong, colorless protective film that improves firmness, strength, rattle, resistance to tear, erasing and folding, and prevention of feathering. Due to the fineness and uniformity of particle size, it is readily soluble. It is slightly alkaline, with a pH range of from 7.2 to 7.8.

Armour standard clear hide glue—for the same field—has a pH range of 6.8 to 7.0. Surface sizing with this fine glue makes blue print, map, chart and similar papers compatible to treatment with tanning agents.

In other fields, there are exceptional Armour adhesives, such as our special hide glue for use as a colloidal flocculant for the retention of fiber and filler. We have other glues for "on machine" creping directly from the Yankee Dryer that contribute the tacking properties necessary for softness in paper tissues. Write today for complete information and prices on Armour glues for paper making.

ARMOUR *Adhesive Division*

Armour and Company • 1355 West 31st Street • Chicago 9, Illinois
Delaware and Spring Garden Streets, Philadelphia 23, Pennsylvania
50 Farnsworth Street, Boston 10, Massachusetts
120 Broadway, New York 5, New York

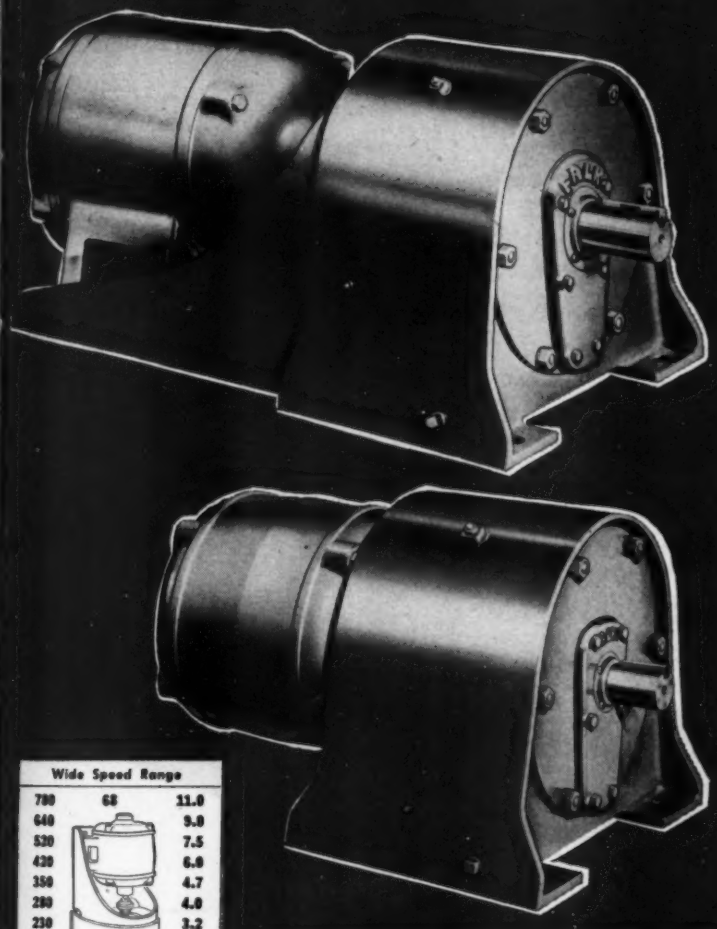
Both... All-Motor and Integral

ALL-STEEL

FALK Motoreducers

use *complete* motors with *no* modifications

...another important reason why you should consult FALK!



You never have the annoying problem of motor modification when you standardize on *all-steel* FALK Motoreducers. Both the universally popular All-Motor type and the newly redesigned Integral type use *completely standard motors without modification.* The motor can be quickly and easily replaced by another standard motor of any make, type or speed within the unit's AGMA rating when necessary without disturbing the reducing unit.

Many users choose the All-Motor type because it permits easy interchange of motors, *or even parts,* on the job, *in minutes*—and because reducer units and/or motors may be readily transferred from one line or plant location to another. Other users select the new Integral type with standard D-flange NEMA motor because it is a highly compact, streamlined unit providing the utmost in space economy.

In every FALK Motoreducer—All-Motor or Integral—the output speed (ratio) can be changed within the unit's torque capacity without modifying the motor.

Both types give you all the quality, adaptability, dependability and long-range economy for which FALK has been celebrated for more than sixty years. FALK Motoreducers are available from factory, field or distributor stocks throughout the country. Write to Department 247.

Every FALK Motoreducer has these "In-built" Factors—

Wide Speed Range. Selective ratio combinations provide output speeds from 1.5 rpm to 1430 rpm with stock gears.

Sealed Housings. Dual closures and one-way vents keep oil *in,* dust and moisture *out.* Units are splash-proof, leakproof, dustproof.

Precision Gearing. Heat treated alloy steel, precision cut and shaved helical gearing throughout . . . quiet-operating crown shaved pinions . . . taper bored gears for easy ratio changes.

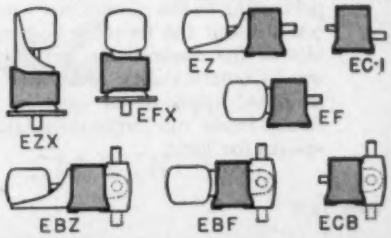
All-steel Housings. Unbreakable, strong, rigid. Generous overhung load capacities provided by wide bearing spans, large shafts and bearings.

Streamlined inside and outside. Smooth, clean surfaces; machine welded construction conforms to NEMA motor frames.

Positive Lubrication. Large sump capacity . . . oil-tight construction assures clean lubricant . . . direct dip of revolving elements provides positive lubrication at all speeds.

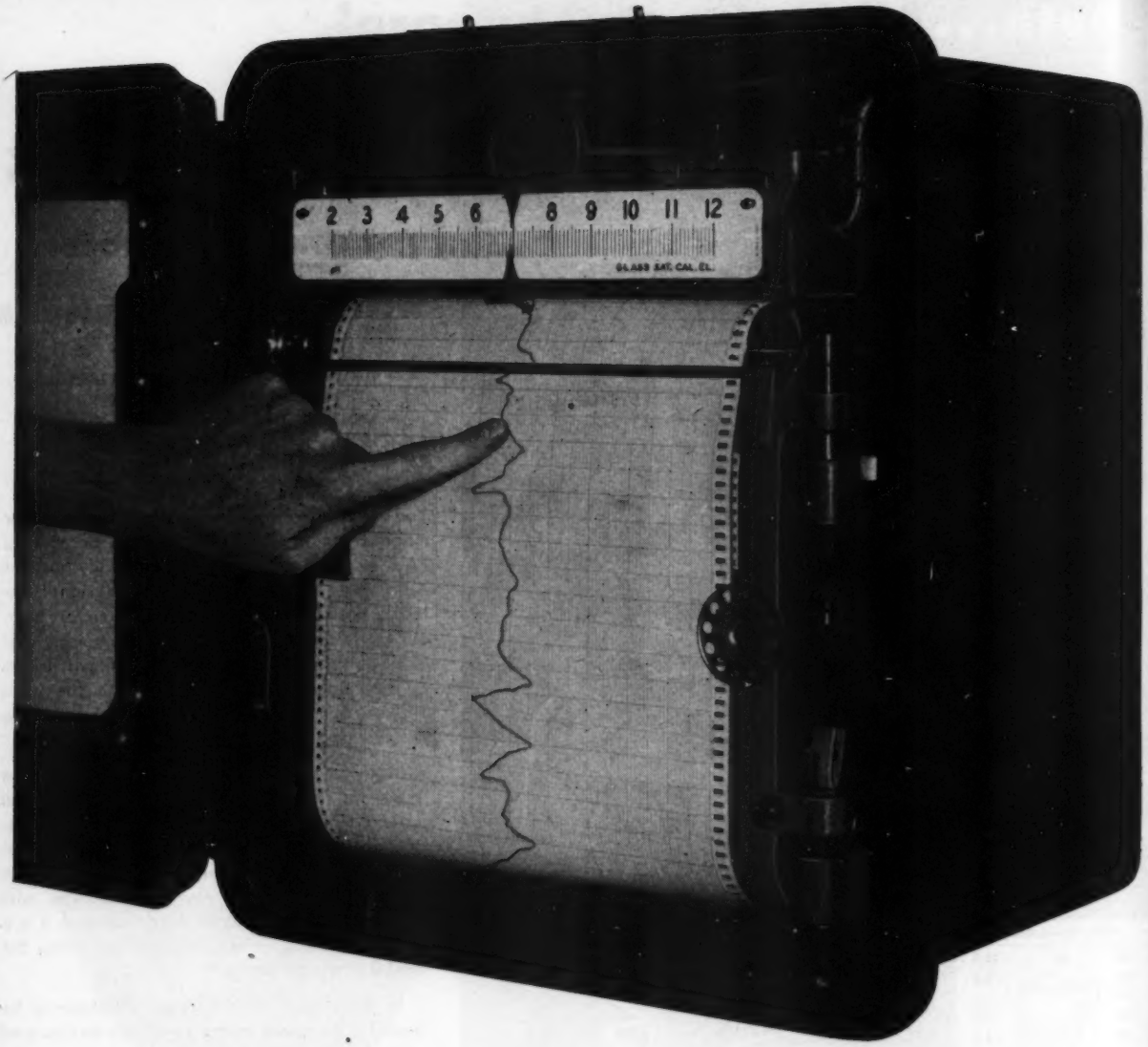
EC

The basic E design permits maximum use of standardized parts . . . closer control over materials, processing, inspection and assembly . . . resulting in faster delivery from interchangeable stocked assemblies.



FALK ...a good name in industry

THE FALK CORPORATION 3001 W. Canal St. Milwaukee 8, Wis.



This is the pH record

. . . being achieved by Speedomax® control on a certain neutralizing process. It didn't just "happen". When we were called in, the pH value was roaming all over the map, in spite of the best efforts of an experienced process operator. But difficult as the problem was for the user, it gave way when attacked by our scientific analysis method.

We asked the chemical engineer for specific information. Adequate facts were readily available, pertaining to the plant's raw waste, the layout and retention of the treating system, the characteristics of the neutralizing agent used. We applied our "Controllability Analysis"—proved by thousands of applications—and in less than half an hour, made our recommendations. The record speaks for itself.

The control results which we predict become *actual* results at *your* plant because complete pH equipments are a package, made and serviced by Leeds and Northrup. They include single and multiple point Speedomax recorders, pneumatic and electrical controls, highly pH-sensitive electrodes and newly designed electrode housings for practically any processing requirement.

For full particulars, send process data to Leeds and Northrup Company, 4974 Stenton Avenue, Philadelphia 44, Pennsylvania.

LEEDS NORTHRUP
instruments *automatic controls • furnaces*

NEW POLYMERS AND COPOLYMERS

from vinyl acetate

tailor-made for qualities you want

toughness and water resistance

NEW RESYN 10K-25

—a polyvinyl acetate emulsion designed to deposit tougher films with high water resistance and superior clarity.

Toughness and water resistance are shown by over 850 strokes without failure on Gardner wet rub tester. Compares with only 19 to 150 strokes for regular polyvinyl acetate emulsion. Films 3 mils thick (wet) air dried 24 hours.

DATA

Solids	55%
pH	4-5
Particle Size	Mostly under one micron
Viscosity	About 2500 cp thins rapidly on dilution

Your problems may be easily solved by a new vinyl acetate polymer or copolymer in emulsion, solution or hot melt form. Address: National Starch Products (Resin Division), 270 Madison Avenue, New York 16, N. Y.

National

RESYNS® · ADHESIVES · STARCHES

It takes TI-PURE®

TITANIUM DIOXIDE

to make paper opaque and bright

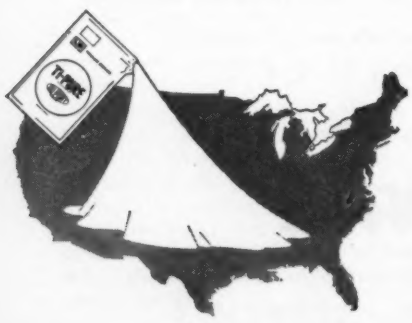
...and Du Pont makes it!

® Reg. trade-mark for Du Pont titanium dioxide pigments

YOU GET a titanium dioxide pigment which is specifically adaptable to paper manufacture. It disperses easily in water, has fine beater retention, low-water and adhesive demand—all of the important features needed for easy and sure use in paper furnishes and paper coatings. It's the best TiO_2 for paper we have ever made!

If you have any questions about the use of titanium dioxide in bread wraps, waxed board, glassine, bond or book—in fact for any paper application, just call us. Our Technical Service or Paper Laboratory may already have the answer; if not they'll be glad to work with you to find it. Just contact our nearest district office or write to: E. I. du Pont de Nemours & Co. (Inc.), Pigments Department, Wilmington 98, Delaware.

PROMPT NATIONWIDE SERVICE THROUGH THESE DU PONT DISTRICT OFFICES* AND WAREHOUSES



Atlanta, Ga.
*Detroit, Mich.
Lockland, Ohio
New Orleans, La.
*Portland, Oregon
*Chicago, Ill.
*Houston, Texas
*Louisville, Ky.
*New York, N. Y.
St. Louis, Mo.
*Cleveland, Ohio
Indianapolis, Ind.
*Malden, Mass.
*Pasadena, Calif.
*San Francisco, Calif.
Dallas, Texas
Kansas City, Mo.
Minneapolis, Minn.
*Philadelphia, Pa.
Seattle, Wash.

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING ... *THROUGH CHEMISTRY*

What is all this talk about service?

Above left to right: Norman C. Gould, Chief Felt Designer; Paul G. Mansuy, Assistant Sales Manager; Irving H. Peters, Manager of Field Service Engineering; Harold S. Dahlberg, Director of Research and Development.

Almost everybody promises "service." But **SERVICE** is more than a word—and it's more than a promise!

SERVICE is a **PRACTICE**, spelled out in **WORK.**

Over the years Huyck has offered and practiced a *complete service to papermakers*...service proven by these facts:

HUYCK has the largest fully-trained field service engineering staff in the felt industry—*working full time for the paper industry.*

HUYCK salesmen have an extensive papermaking background plus thorough training in felt manufacturing.

HUYCK pioneered in laboratory service to papermakers, and still leads the field with the largest and best-equipped research and development laboratory in the felt industry...always entirely at your service to investigate and solve your felt problems.

HUYCK performs continuous research to advance the science of papermaking through improved felt manufacture.

This is the finest service record in the industry. It is not just a word, not just a promise, but a fact...a record you can depend on.

HUYCK FELTS

first in quality...first in service

F. C. HUYCK & SONS • *ESTABLISHED 1870* • RENSSELAER, NEW YORK

We make a

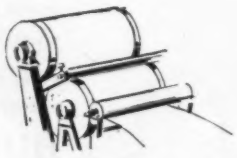
CORN STARCH

to fit your every need

Whether your primary consideration is price, quality, or versatility, we make a starch that fits your requirements precisely.

BEATER ADDITIVE

Our Amijel Brand Corn Starches are thick-boiling, pre-gelatinized starches highly preferred because of their increased cold-water dispersibility. They are widely used in the manufacture of specialty boards and papers of high quality.



SURFACE SIZE

Our Eagle Brand Pearl Corn Starch is a popular starch for surface size. It is a thin-boiling starch of high fluidity. It is recommended for its ease and uniformity of conversion.

LAMINATING ADHESIVES

A full line of dextrines and gums is available to meet all bonding and adhesive requirements. Our Lam-o-dex brand dextrines are becoming increasingly popular. Lam-o-dex yields paper board of great strength and durability.

CORRUGATING ADHESIVE

Our Globe Brand Pearl Corn Starches and Coragum Starches...thicker boiling starches are increasingly popular with manufacturers who require this type of starch. They have short cooking time, make a thicker paste with greater covering power and have increased adhesiveness.

Investigate the advantages of Corn Starch.
Call our Technical Service
Department for free consultation.

CORN PRODUCTS REFINING COMPANY • 17 Battery Place, New York 4, N. Y.

At least 170 thousand forest fires start each year, burning more than 15,000,000 acres of timber land. Yet much of this shameful waste could be avoided, as nine out of ten forest fires are man-caused and preventable. Prevention of future fires down through the years is primarily a matter of organization and education.

The men and management of Weyerhaeuser Timber Company are keenly aware of the necessity of protecting forest lands from fire.

In the fall of 1941, Weyerhaeuser established the first officially designated "Tree Farm" at Montesano, Washington. Dedicated to the perpetual production of trees, Tree Farm rules require that adequate protective measures be instituted against fire, insects, and disease.

Today, all Weyerhaeuser Timber Company operating forest lands are tree farms, managed by skilled foresters. This tree farming system, wholeheartedly sponsored by Weyerhaeuser, guarantees the Pulp Division's customers an assured supply of woodpulp for the many years stretching ahead in the "cellulose age" in which we live.

THEY CAN'T SEND ME TO JAIL FOR THIS . . .

This is Ham Feltz talking. My sponsors, Shuler & Benninghofen, have called attention to a recent ruling of the court that forbids manufacturers of sheets and pillow cases to claim that their products will give any specified number of years of service or survive any given number of launderings because no such claims can be accurately established by tests or in any other manner.

That applies equally to paper-makers' felts. So much depends upon the character of the furnish, the speed of the paper or board machine, the temperature of the drier rolls and the amount of squeeze by the nip of the press. You can run newsprint or thin paper much faster than board.

But I can tell you this—for every sheet there is a particular Hamilton Felt that will do your work as well as it can be done, as fast as it can be done and at as low cost as it can be done on any machine now known to the industry. Furthermore, you can establish these claims by your own tests and in your own way. Thank you.

MIAMI WOOLEN MILLS

Established 1858

Hamilton Felts

SHULER & BENNINGHOFEN, HAMILTON, OHIO

Electronic spacer patterns guide stockpile through sequence of cuts automatically. Responsive Oilgear Transmission provides speedy travel with pin-point stopping within 3/1000ths of an inch from zero tolerance. Lawson Cutter also used in repetitive single cuts and for trim on sides. Photo in plant of Liedtke Brothers, Chicago.

The RESULT?

Accuracy just 900% better

Production increase 50 to 500%

ver and over and over again, ilgear Fluid Power proves to be he right solution to a drive problem. ake the case of the Lawson Cutter.

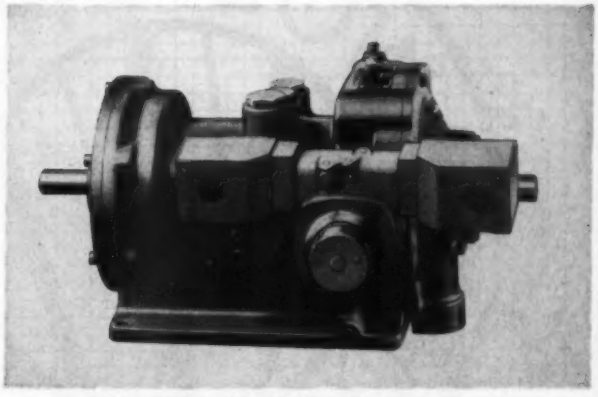
precision is emphasized anywhere, that "where" is e field of fine color printing of every description. oney, time, effort are spent that art be right, that plates e right, that printing be right—to a hairline. And then mes the cutting operation where all that has gone efore is saved—or wasted. Small wonder that cutting mained a hand operation for many years.

But the E. P. Lawson Company, manufacturer of cut- g machines, wanted to modernize and mechanize the peration. Its designers turned to an electronic spacer vice. This if anything would give precision in mark- g *where* to cut. But the next problem was to find a wer drive capable of *obeying* the orders the elec- nic signal system was capable of *giving*. Lawson ed one type of drive. It varied all over the map. wson tried another type of drive. It was fairly accurate but did not hold up.

Finally, as so many machine designers have done, wson turned to Oilgear. And there, as so many chine designers have done, Lawson found the answer its problem.

The answer? Undeviating accuracy within 3/1000ths an inch from zero tolerance—just 900% better than hat had been achieved in the past; speed, translating lo production increases of 50% to 500% month in d month out. How? Through the absolute responsive- ss of Oilgear Fluid Power Drive to the automatic ntrol system. Immediate, shockless acceleration to ll speed "forward". Precise measured slowdown as e feed fence nears the target. Precision stopping "on rget" for the cut and then rapid acceleration toward e next cut.

Here again is an example of the superlative "right-



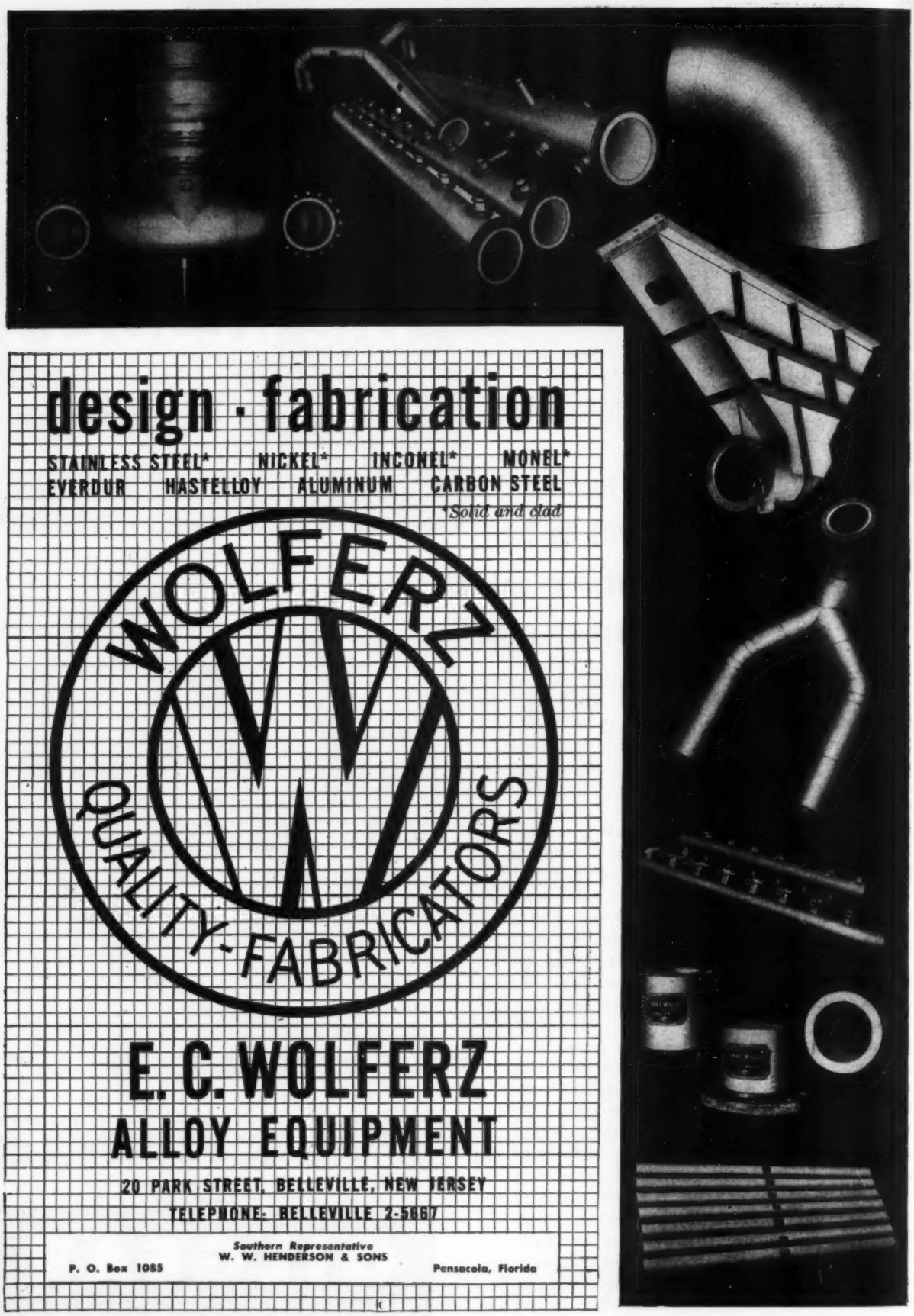
Oilgear Two way Variable Speed Transmission as used on Lawson Electronic Spacer Cutters. These drives also provide unlimited speed range from zero to maximum. Speed changes made in split second or specified time.

ness" of Oilgear Fluid Power "generators," motors, transmissions—for almost any type of installation or machine requirement, big, little, and all those in between.

Chances are Oilgear is *the* solution you've been looking for. And Oilgear engineers will be just as quick to tell you if Oilgear is *not* for you. Ask for further information from an Oilgear Engineering Representative. No charge. No obligation. THE OILGEAR COMPANY, 1578 W. Pierce St., Milwaukee 4, Wisconsin.

OILGEAR

OILGEAR



design · fabrication

STAINLESS STEEL* NICKEL* INCONEL* MONEL*
EVERDUR HASTELLOY ALUMINUM CARBON STEEL

*Solid and clad

WOLFERZ
QUALITY-FABRICATORS

E. C. WOLFERZ
ALLOY EQUIPMENT

20 PARK STREET, BELLEVILLE, NEW JERSEY
TELEPHONE: BELLEVILLE 2-5667

Southern Representative
W. W. HENDERSON & SONS
P. O. Box 1085 Pensacola, Florida

here again is an example of the superlative "right-

For ... • DESIGN • FINISH • DEPENDABILITY
• UNIFORMITY • SERVICE

APPLETON WOOLEN MILLS
APPLETON • WISCONSIN

Paper Makers! SOLVAY gives you

to best fit your individual needs!

SOLVAY'S TECHNICAL SERVICE IS DIFFERENT—because it is established on an *industry-wide* basis—with *special sections* for *different industries!* For the paper industry, SOLVAY has a *separate technical group* that can offer unique services not ordinarily available.

THESE TOP-NOTCH CONSULTANTS have had years of specialized training and practical experience in the paper industry. They are ready to assist you in the development of a new or improved process . . . suggest better methods of handling, storing and using SOLVAY products.

SOLVAY'S PAPER SERVICES INCLUDE: field service . . . laboratory service with a section devoted exclusively to paper . . . and authoritative technical bulletins.

SALES-SERVICE—SOLVAY'S 13 branch offices with their organization of paper industry representatives assure close, personal attention to the requirements that best fit the particular needs of small and large paper makers.

PROMPT DELIVERY SERVICE—SOLVAY'S strategically located plants and over 200 local stock points insure prompt delivery of any size order. So when you want service—*call* SOLVAY *first* for these paper-making chemicals . . .

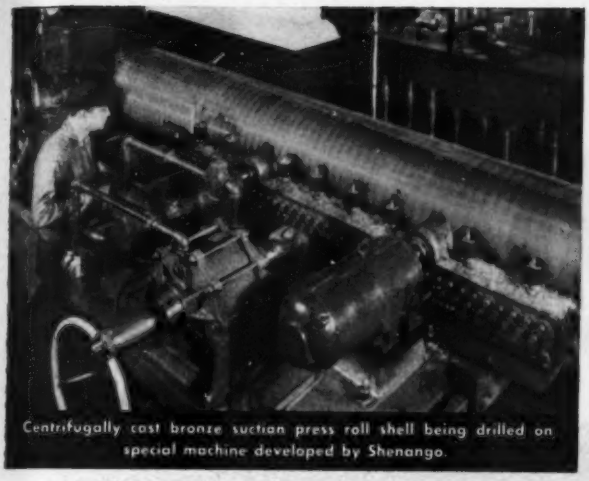
SOLVAY PROCESS DIVISION
Allied Chemical & Dye Corporation
61 Broadway, New York 6, N. Y.

BRANCH SALES OFFICES:
Boston • Charlotte • Chicago • Cincinnati • Cleveland
Detroit • Houston • New Orleans • New York • Philadelphia
Pittsburgh • St. Louis • Syracuse

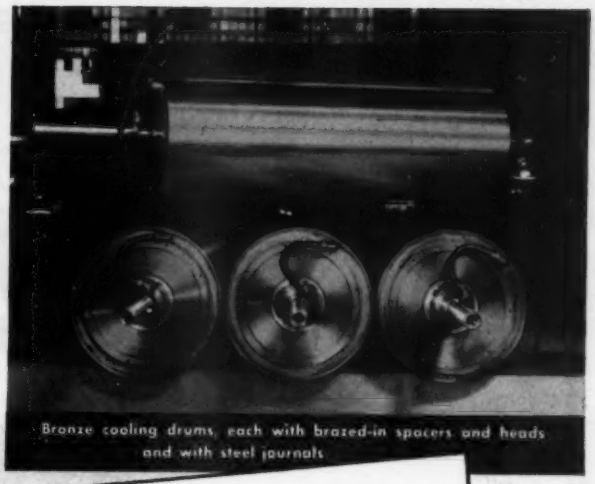
SOLVAY

SODA ASH
CAUSTIC SODA
LIQUID CHLORINE
CALCIUM CHLORIDE

Soda Ash • Caustic Soda • Potassium Carbonate • Calcium Chloride • Cleaning Compounds • Caustic Potash • Sodium Nitrite
Chlorine • Ammonium Bicarbonate • Sodium Bicarbonate • Ammonium Chloride • Snowflake® Crystals • Monochlorobenzene
Para-dichlorobenzene • Ortho-dichlorobenzene



Centrifugally cast bronze suction press roll shell being drilled on special machine developed by Shenango.



Bronze cooling drums, each with brazed-in spacers and heads and with steel journals

Why it pays to Specify Shenango

BECAUSE of Shenango's centrifugal casting process and high precision machine work, Shenango-made rolls and roll assemblies give better service, last longer and save you dollars. Centrifugal casting provides stronger, pressure-dense metal, finer, more uniform grain and freedom from sand inclusions, blowholes and other weakening defects.

Shown on this page are only a few of the many types of rolls, roll cores, drums and assemblies produced in bronzes and Meehanite Metal by Shenango for use in the paper industry.

It will pay you to specify Shenango. For further information or data on meeting your specific needs, write to: Shenango-Penn Mold Company, Centrifugal Castings Division, Dover, Ohio (*Executive Offices: Pittsburgh, Pa.*).

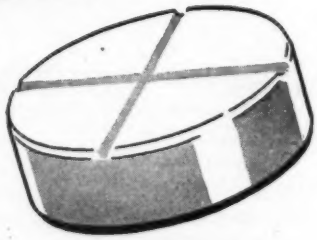
SHENANGO

ALL RED BRONZES · MANGANESE BRONZES · ALUMINUM BRONZES
MONEL METAL · NI-RESIST · MEEHANITE METAL

Stretch beam rolls (for Fourdrinier wire cloth) produced by Shenango in centrifugally cast Meehanite Metal

Bronze breast roll with steel inserts, centrifugally cast, finished and assembled in the modern Shenango shops

Vanzyme discs



EASY TO
STACK AND HANDLE

STARCH CONVERTER

for

TUB AND CALENDER SIZING
COATING AND
LAMINATING ADHESIVES

Increase
ACCURACY
ECONOMY
EFFICIENCY
AND SPEED

R. T. VANDERBILT CO., Inc.

230 Park Avenue, New York 17, N. Y.

The Paper Industry

February 1954

Are we understaffed at the technical and planning level?

Already progress in instrumentation and automatic control is far ahead of the average pulp and paper mill's ability to service, maintain, and utilize this type of equipment at a level of optimum advantage.

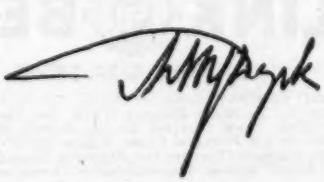
Even such a comparatively uncomplicated operation as wood-handling in mill yards — as disclosed in a study presented by G. H. Mikkelborg, Ontario Paper Company Ltd., at the 40th Annual Meeting of the Canadian Pulp and Paper Association — shows that quite frequently major fundamentals of materials handling are either ignored or not fully understood. All this, of course, is at the expense of productivity and tremendous savings that could have been realized through a well-planned layout, selection, and standardization of stacking and conveying equipment.

We can be sure that progress in equipment development and improvement has not come to a halt. The current increasingly critical evaluation of conventional equipment and processes by our scientists and engineers foreshadows revolutionary changes in the near future.

The most important thing, therefore, is not how much pulp and paper a certain mill is producing today or in the course of the current year, but how quickly and with what ease it can adjust itself to a changed technology, economy, market, and even new products.

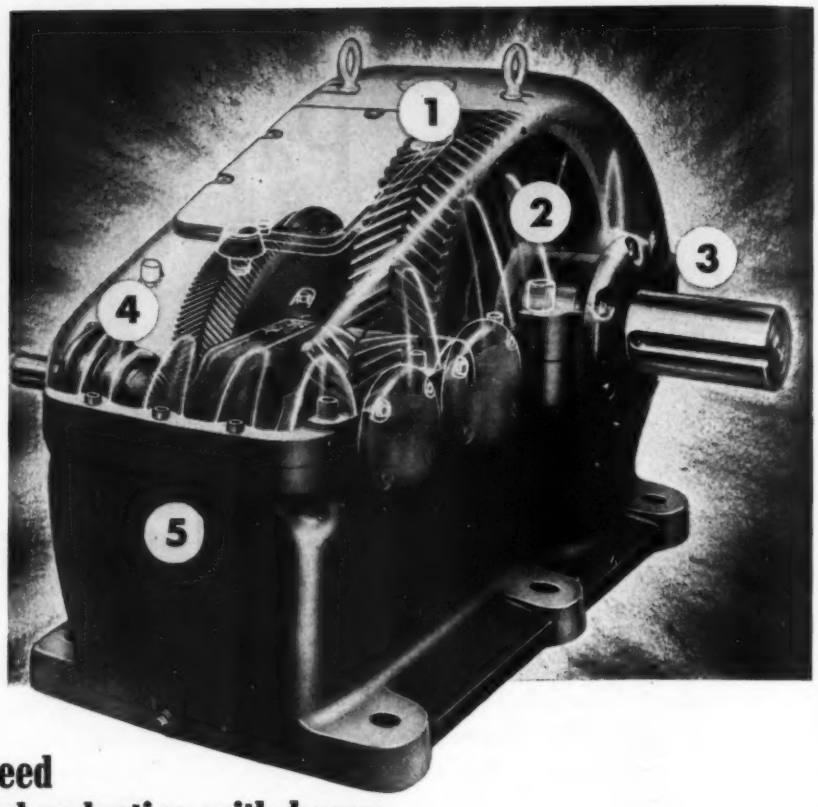
While the mill's competent overall operating personnel is an assurance of maintaining a high current production rate, it will pay each individual company to make a survey of available talent to decide whether it is adequately staffed with high caliber men who are capable of gleaning the maximum productivity from the modern equipment at our disposal today and who can undertake the long-range production and marketing planning that must be part of every successfully growing industrial operation.

A mill adequately staffed at the technical and planning level, can view the future with unlimited confidence that springs not from a blind faith but from a cool intelligent appraisal of the industry's greatest potential growth which is still to be attained. Such a mill will not be easy prey to fear and panic every time we are confronted with economic or political danger signals or when we are led into a changed economy. We believe there is food in this for thought.



LINK-BELT PARALLEL SHAFT DRIVES offer 5 big quality extras

1. **GEARS** are precision-shaved. All shafts are rigidly supported to preserve alignment far beyond rated capacity.
2. **ROLLER BEARINGS** are used throughout. Sizes are adequate to handle heavy shock and overhung loads.
3. **GREASE-LUBRICATED SEALS** prevent entrance of dirt and water. Seal housing design provides heavy grease collar for each input and output shaft.
4. **AUTOMATIC SPLASH LUBRICATION** reliably supplies oil to all bearings, gears and pinions at all speeds.
5. **STURDY HOUSING** is designed so all parts can be removed without disturbing base, which can be grouted in concrete.



When you need high-hp speed reduction with heavy shock loads, Link-Belt gives you

everything you want in PARALLEL SHAFT DRIVES

BECAUSE they withstand heavy shock loads, Link-Belt parallel shaft drives are the low-cost answer for many high-hp speed reduction problems. Simultaneous engagement of several teeth assures smooth operation and great load carrying capacity.

What's more, the elimination of power-wasting vibration results in sharply reduced power consumption. Other benefits include quiet operation and increased efficiency.

Link-Belt parallel shaft drives are available in 2.84:1 to 318:1 reduction ratios, ½ to 1000 hp, 2 to 600 output shaft rpm. Ask for Book 2519.

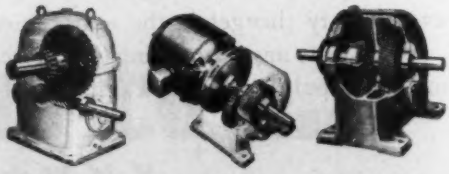
LINK-BELT

ENCLOSED GEAR DRIVES 13.406

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

WHY PRE-INTEGRATED LINK-BELT DRIVES CUT YOUR POWER TRANSMISSION COSTS

In addition to all three types of speed reducers, Link-Belt builds variable speed drives, fluid drives, chains, sprockets, couplings, bearings, shafting. All are pre-engineered for easy installation and maximum efficiency.



Worm Gear Drives — ask for Book 2324-A

Gearmotors — ask for Book 2247

Helical Gear Drives — ask for Book 2451

The Paper Industry Current Comment

Too many calories . . . tax and labor legislation . . . and foreign trade

The Administration has presented Congress with a menu of proposed legislation which has so many calories that it is exceedingly doubtful if it can be fully digested at the present session.

Legislative proposals sponsored by the Administration range all the way from expanded social security to revision of existing labor legislation, modifications in the national budget, tax revision, and other programs so diversified that they have been the subject of separate messages by the President.

At least one item on the program — foreign trade — may prove such a "hot potato" that any action on the Randall Foreign Economic Report may be delayed for a year, until after the November elections. In such an event the present Reciprocal Trade Agreement Act, which expires in June, may be merely extended in its present form for another year. An alternative is to allow the law to expire and to be rewritten in its entireity by the next Congress. In such event, however, the reduced duty rates now in effect will continue at their present levels. The only change will be that no new tariff reductions can be negotiated in the interim.

Much of the suggested legislation will have a bearing on the paper industry. Modified tax legislation such as the reduction of the excess profits tax would immediately make available more funds for distribution in dividends and give an additional backlog to corporation treasuries. Many paper companies would be affected by such a change, some involving very large sums annually.

The paper industry and labor

What labor legislation may mean to industry is shown by the condition in the paper industry resulting from a prolonged strike in the plants of two important can companies. The ramifications are wide-spread. The Covington mill of West Virginia Pulp & Paper Co. was shut down for 11 days in December, due in large measure to a lack of orders from the struck American and Continental can companies. Another factor was the loss of business due to the West Virginia company's own strike last fall. Inability of the company to fill orders resulted in the placing with other companies of orders formerly filled by West Virginia. To a certain extent the West Virginia strike was a case of crippling the goose which laid the golden eggs of wages for the mill workers, even if the goose still survives. This is not an isolated instance, but a typical example of what has happened at times throughout the entire industry.

The American paper industry has gone officially on record against the proposed Japanese development of a pulp industry in the Alaskan national forest area. Speakers for the domestic industry told the United States Senate Committee on Interior and Insular Affairs that the North American producers of pulp are now ready to negotiate long term contracts for the supply of pulp to all comers, including the Japanese. It was argued that the authorization for the use of the United States national forest timber by the Japanese is contrary to the national interest.

$16,000,000 Pakistan mill

Another huge foreign paper mill development through the agency of the United Nations or the World Bank is projected. Pakistan wants to establish a $16,000,000 paper mill to make that country self-sufficient in its paper requirements, and eventually to produce enough surplus for export. At present, the country's needs are supplied by American and European producers, who sell about $20,000,000 of paper to Pakistan annually. By establishing its own mill Pakistan believes it can save $15,000,000 a year for its over-all economy and is trying to get the needed funds through United Nations auspices from the World Bank or through the U. N. Technical Assistance Program. In any event, the United States will be providing a material share of the cost of the undertaking, a Pakistan government enterprise. The present plan is for the building of a mill to produce 100 tons of pulp a day, and the conversion of this pulp into paper, but in six years the plan is to expand the production to 200 tons, which would provide paper products for export.

Financial Reports

The upsurge of market prices that came with the improved atmosphere in Washington carried paper industry securities along with the wave. The result: most quotations were materially higher than in December.

Net incomes

MacMillan & Bloedel, Ltd.—Net profit for the fiscal year ended September 30 was $11,315,668, compared with $13,818,340 in the preceding year.

New Haven Pulp & Board Co.—Net income for the year ended September 30 was $702,723, as compared with $833,427 for last year.

Dividend declarations

Fibreboard Products, Inc. has authorized a regular quarterly dividend of $1.50 a share on the prior-preferred stock, payable February 1 to stock of record January 16.

International Cellucotton Products Co. has declared an extra dividend of 30 cents on the common stock, payable January 8 to stock of record December 28.

Marathon Corp. has declared a quarterly dividend of 30 cents a share on the common, payable February 27 to stockholders of record February 8, and a quarterly dividend on the preferred stock of $1.25 a share, payable April 1 to stockholders of record March 19.

Mead Corp. has declared a quarterly dividend of 45 cents per share on the common and a quarterly dividend of $1.0625 per share on the 4¼ per cent cumulative preferred stock, both payable March 1 to holders of record February 2.

Minnesota & Ontario Paper Co. has declared a quarterly dividend of 50 cents per share on the common stock, payable January 30 to shareholders of record December 31.

Oxford Paper Co. has declared an extra

Middletown Sees Good Year; Paper Industry Optimistic

1954 WILL BE A YEAR of readjustment to normal peacetime operations, a year that will see a return to competition, a year of slight decline from the peak levels of recent years—but only slight.

The paper industry is gearing itself to the extra sales effort that will be necessary but is generally optimistic in its outlook. Strengthening its faith in the future is the never-ending development of new products. Constant research is discovering new fields, as paper supplants other materials.

These views for 1954—both locally and nationally—have been expressed by officials of the paper and allied industries in Middletown, Ohio. In a special year-end issue, the *Middletown Journal* quotes local industrial leaders, not one of whom was pessimistic. All, however, took occasion to sound warning notes: there will be readjustments, greater effort will be required, overhead expense must be carefully watched, and spirited salesmanship will be a must.

Almost as good as 1953

A center of the paper industry in the Miami Valley, Middletown looks to the experienced executives in that field for an indication of what the business barometer will do. And the *Journal* sought their opinion.

E. T. Gardner, president of *Gardner Board & Carton Co.*, pinned U. S. hopes in the future on the ability to remain strong both economically and militarily. "I believe the 1954 industrial picture will be a good one over-all," he said. "We may have a slow start . . . but I believe business will then pick up momentum."

Except for "old wives' folktales of inevitable recession," there's little now to indicate an impending slump of any real proportion. This confidence was expressed by Earl E. Grant, president of *Crystal Tissue Co.* Noting Crystal's extensive building program of recent years, he declared that expansion would continue in 1954 with a $350,000 boiler installation.

The Sorg Paper Co., according to its president, Donald G. Driscoll, is entering 1954—both productively and financially—in a position that compares favorably with industry as a whole. The firm's optimism is demonstrated by the fact that since the close of World War II $4,000,000 has been invested in capital improvements.

W. B. Zimmerman, executive vice president of *Howard Paper Mills Inc.*, predicted a good future. "We have constantly expressed our optimism and faith in our industry by investing in expansion and growth," he said. Mr. Zimmerman pointed to recent building programs at the Aetna Paper Co. Div., the Maxwell Paper Co. Div., the Dayton Envelope Co. Div., and the Howard Paper Co. Div.

Among other paper industry executives who voiced confidence in the coming year were N. J. Downing, eastern divisional sales manager for *Inland Container Corp.*; C. M. Jones, vice president and treasurer of *Harding-Jones Paper Co.*; J. J. Hallowell, president of *Wrenn Paper Co.*, and James Hardwick, general-manager of the Middletown Div. of *Pollack Paper Corp.*

In the allied field, too, Middletown industry looks ahead. Officials of the *Black-Clawson Co.* expressed the belief that the firm's business "is now at the level where it should be." During the year B-C will spend about $1,000,000 on plant improvements in all divisions. Of this, $200,000 has been allocated to the Shartle Bros. Machine Div. in Middletown.

of 20 cents on the common, payable January 15 to stock of record January 2. A previously declared dividend of 25 cents also will be paid January 15.

Stock and Bond Quotations

New York Stock Exchange—Stocks

Closing Prices	Jan. 21, 1954	Dec. 21, 1953
APW Products	*3⅛—3½	*3⅜—3⅝
Celotex	18¾	16¼
Same Preferred	15⅞	16⅞
Certain-Teed Prods.	13⅞	12¼
Champion P. & F. Co.	33½	33
Same Preferred	101¾	*97¼—97¾
Chesapeake Corp.	*27¼—27½	26¾
Container Corp.	43⅞	44¼
Same Preferred	*101½—104	*101—102
Continental Diamond	11½	10⅝
Crown Zellerbach	36¾	35⅝
Same Preferred	102¼	*101¼—101½
Dixie Cup	43	40
Eastern Corp.	16½	15
Robert Gair	20⅛	19½
Gaylord Container	25¾	25
Great Northern P	59	*53—54
Hammermill	*14⅝—14⅞	12⅛
International	57⅝	56⅛
Same Preferred	104½	*101—101½
Kimberly-Clark	49⅛	48¾
Same Preferred	*107—109	106½
MacAndrews & Forbes	41½	41
Marathon	21	19⅝
Masonite	18⅝	17¼
Mead Corp.	30	29
Same Preferred	88	*87—88
National Container	10½	10½
Same Preferred	*20½—20¾	19⅝
Rayonier Inc.	27⅞	29½
Same Preferred	33⅜	31¾
Scott Paper	73¼	69⅛
Same $3.40 Preferred	*92½—93½	*90½—91½
Same $4.00 Preferred	*101-103	*100½—102
St. Regis Paper	21¼	20⅛
Same Preferred	95	
Sutherland Paper	32½	*93½—95½
Same Preferred	*113½—116	30⅞
Union Bag & Paper	45¼	*108¾—111
Union Board & Carton	14½	43 15
United Wallpaper	1¾	1⅝
Same Preferred	17	15¾
U. S. Gypsum	117½	117
Same Preferred	*175—177	*172¾—174
West Va. P. & P.	25⅝	25⅜
Same Preferred	108⅛	*106⅝—107

New York Stock Exchange—Bonds

Celotex 3¼%	99¼	...
Champion P. & F. Co. 3%	...	96⅝
Mead Corp. 3%	...	...

American Stock Exchange—Stocks

American Writing	12¼	12¾
Brown Co.	10½	8½
Same $5.00 Preferred	*91¼—93¼	90¼
Same $3.00 Preferred	*50—52¼	50½
Puget Sound	34	31¾

*Closing Bid and Asked Prices.

Additional copies available . . .

PAPER and PULP MAP of the UNITED STATES . . . Wall Size 42" x 58"

Illustrates:

1—Boundaries of Forest Areas and Kinds of Woods . . .
2—Location and Identity of Integrated Paper and Pulp Mills . . .
3—Location of Paper and Paperboard Mills, not processing own pulp . . .
4—Pulp Mill Saturation Areas . . .
5—Daily Tonnages, Capacities by Regions . . .
6—Kinds of Paper and Paper Products Manufactured . . .

Map based on 1951 railroad map supplied by Army Map Service . . . Issued as a supplement to the December, 1953, issue of The PAPER INDUSTRY

$1.50 *Postpaid*

FRITZ PUBLICATIONS, Inc.
431 South Dearborn Street • Chicago 5, Illinois

AUTOMATIC WIRE GUIDE provides consistent guiding response at all machine speeds. This patented Beloit Air Guide needs only moderate air pressure for smooth, dependable control of wire position. No ratchet mechanism to be driven by the contact of the control palm with the wire. Simple, rugged design means trouble-free operation, minimum maintenance.—*Beloit Iron Works, Beloit, Wis.*

BELOIT

PAPER MACHINERY

WHEN YOU BUY BELOIT...YOU BUY MORE THAN A MACHINE!

Have you investigated the advantages of the Ammonium Bisulphite Pulping Process?

Get the facts now on how you can produce bigger yields of better quality pulp at lower cost with the Ammonium Bisulphite Pulping Process. Pioneered by Nitrogen Division, the process is the most important recent development in acid pulping.

Without charge or obligation, let a member of Nitrogen Division's technical staff give you all the facts. He will show you how to convert your mill to this process at very low cost and with practically no loss of production during the change-over period.

Improve your position in acid pulping. Write, wire or telephone! Your inquiry will receive prompt attention.

1. More Pulp from Wood: The Ammonium Bisulphite Process produces a higher proportion of acceptable pulp, thus increasing the capacity of knotters and fine screen equipment. Also increases the capacity of deckers and washers because of the increased freeness of the pulp.

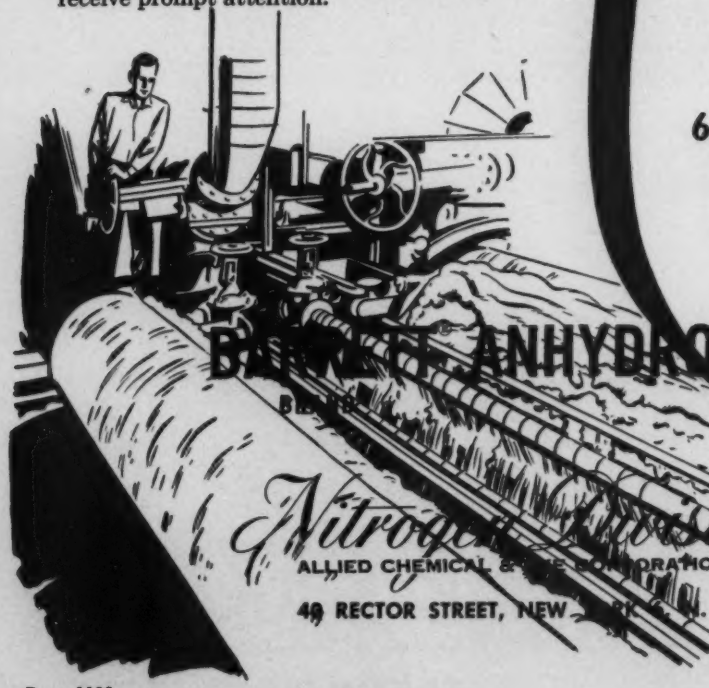
2. Better Quality Pulp: The Process produces stronger, lower ash, brighter unbleached pulp, more uniform quality gradation, and lower screened speck count. Less bleach chemical is needed to bleach ammonia base pulps.

3. Saves Steam: Cooking time and maximum temperature are reduced because of superior penetration of chips by ammonia. Maximum temperature has been reduced as much as 30° F.

4. Saves Money: One ton of ammonia replaces three tons of limestone in the pulping process. Saves the labor of handling limestone, and eliminates scaling and other undesirable effects of calcium base acid in all sections of the mill.

5. Abates Stream Pollution: The Ammonium Bisulphite Process lends itself readily to evaporation of waste liquor and combustion and recovery of heat and chemicals, thus overcoming stream pollution.

6. Low Conversion Costs: You can convert to the Ammonium Bisulphite Process at very low cost, with practically no loss of production during the conversion period.



BASED ON ANHYDROUS AMMONIA

Nitrogen Division

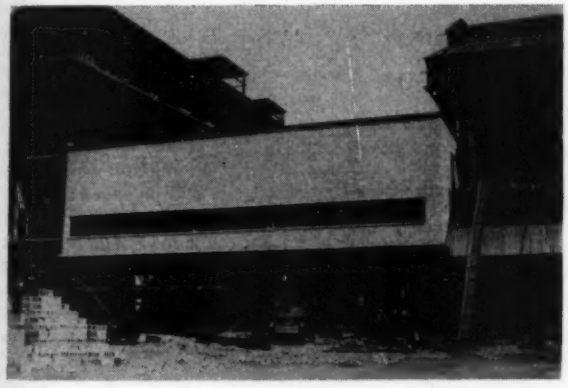
ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET, NEW YORK 6, N. Y.

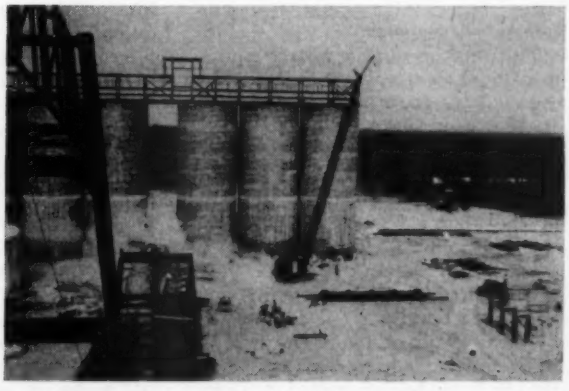
NITROGEN DIVISION ALLIED CHEMICAL

TIME AND LOCKER building at Rayonier's Jesup plant

GENERAL VIEW of construction early in November



CLOSE-UP VIEW of main section of the new mill



CHIP SILOS with chip carrier under construction

Rayonier's New Georgia Plant Nears Completion; Operation Expected Soon

ONE OF THE WORLD'S most modern chemical cellulose plants is nearing completion on the south bank of the Altamaha River at Jesup, Ga. Being built for Rayonier Inc. at a cost of more than $25,000,000, the new mill has been dubbed a "mirror image" plant.

The operation has been designed so that its 87,000-ton annual production can be doubled with comparative ease when the time is right. The Jesup mill — the firm's fifth — will increase Rayonier's production 20 per cent, already upped 15 per cent since 1945, when the company's large expansion program was started. Operation is expected in early spring.

All major buildings have been completed, as have the stack, chip silos, water treatment plant, finishing, warehouse, shops and recovery plants. Heavy machinery was being installed early in January. Progress has been accelerated by the employment of more than 40 contractors and the maximum use of mechanized equipment.

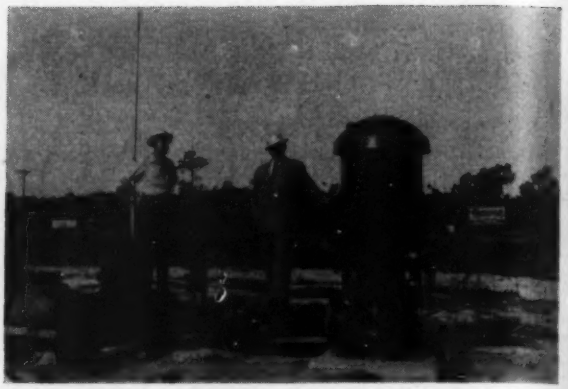
Better operating economy

Because of the climatic conditions peculiar to southeast Georgia, certain large pieces of equipment essential to the production of chemical cellulose (usually housed indoors) have been located outdoors for the first time in such a mill. Aside from important climatic considerations, a major reason for placing the equipment outside was expected better operating economy.

Rayonier several years ago acquired 538 acres of land for the plant site. The first major unit of plant equipment to be installed after the June 1952 ground-breaking was 5 miles of railroad track laid immediately after the 92-acre plant area had been graded. Spur tracks were put down to give access to both the Atlantic Coastline and Southern railroads.

Four deep wells will pump some 18,000,000 gal. of water daily for

WATER PROCESSING and purification system at Jesup



4,000,000-GALLON Layne pump at chemical cellulose mill

the plant's operation. The purified effluent will discharge into the Altamaha without adversely affecting plant or fish life. And large electrostatic precipitators will remove most of the solid matter from the mill smokestack, thereby greatly reducing and controlling odors. Rayonier designed the entire plant in an effort to hold air and stream pollution to a minimum.

Push-button operation

Pulp making and auxiliary equipment includes eight stainless steel digesters 12 ft. in diameter and 54 ft. high.

The Jesup Division will be operated entirely by electricity generated by steam. Source for the steam will be the plant's waste products from chemical cellulose production, such as spent liquors and bark.

The administration, laboratory, and personnel buildings — constructed by S. S. Jacobs — were the first to be completed and are in use while the mill is being erected. These administrative-type buildings are year-round air conditioned and boast the newly-developed tinted windows designed to reduce sun glare and heat.

The new mill is under the supervision of Russell F. Erickson, Rayonier's vice president in charge of engineering and plant development.

New foundation technique

The mill site was loose, sandy soil. A relatively new method was employed to create a solid foundation: vibro-flotation. First used in Florida, where the process of vibrating sand to build a stone-hard foundation had been tested with great success, the Jesup operation represents the second major application of the method. Approximately 150,000 sq. ft. of sand to a depth of 20 ft. were treated by the soil-compaction process.

The prime feature of the system is that it replaces piles for the construction of a solid foundation in soft or sandy soils. Actually, an artificial rock strata or shelf upon which all plant buildings rest results from this novel technique, which was developed in Germany just prior to the termination of World War II.

The erection of four large diameter pre-stressed concrete circular tanks involved an intricate bit of construction. Much of the work involved field fabrication. Circular wood forms were first placed on the outside and gunited on the inside. The forms were then removed and vertical pre-stressed wires placed on the inside. The domed top was then placed and gunited. The outside was then enveloped with horizontal pre-stressed wires. Finally, gunite was applied to inside and outside alike to cover the wires.

The size of the project is best comprehended by the quantities of materials being used: 3,000 tons of structural steel for the buildings; 1,000 tons of plate steel for tanks alone; 3¼ miles of paved roadways; 21,000 cu. yd. of concrete. The working force at times numbered 875.

Suppliers and engineers

Ebasco Services Inc. is responsible for design engineering and construction and is represented at Jesup by Ralph J. Kutchera, project field manager.

Steel fabrication and erection was performed by Bristol Steel & Iron Works. Reinforcing steel construction was by Atlantic Steel Erectors, as subcontractor for J. A. Jones Construction Co. Chicago Bridge & Iron Co. was fabricator and erector of the steel tanks. Rowland Tompkins & Son was responsible for the piping. Stebbins Engineering & Mfg. Co. installed the chip silos and storage tanks. Eichley Corp. handled machinery erection, while Rollinson Engineering Co. installed the electrical systems. Paul A. Laurence Co. is erecting the boilers.

The pre-stressed circular tanks were erected by Preload Central Corp., and the plant's stack was built by M. W. Kellogg Co. Wells were prepared by Layne Atlantic Co., and water softening equipment was supplied by Cochrane Chemical Co. and Infilco Inc.

•

$800,000 Southern Expansion Plans Reported by Simplex

Two new waterproof asphalt laminating plants will be constructed in the South by Simplex Paper Corp. of Adrian, Mich. The announcement was made by Charles G. Wood, president of the firm.

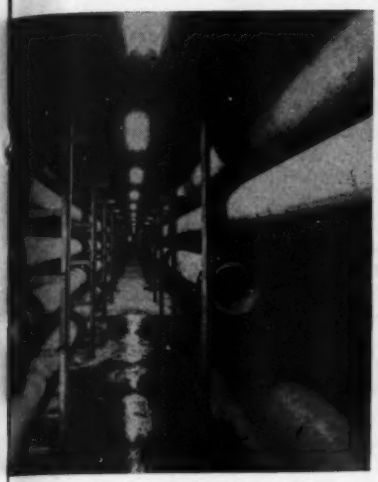
Unit No. 1 is to be located at Crossett, Ark. Production equipment will consist of a high-speed asphalt paper laminator trimming 120 in. and designed and built by Frank W. Egan & Co. Slitting and rewinding units will be supplied by Samuel M. Langston Co. and Cameron Machine Co.

The plant will be constructed to the firm's plans and specifications. The land area covers 140,000 sq. ft., buildings and loading dock area 27,600 sq. ft. All operating floors will be at railroad car floor height; concrete and steel construction will be used, and fire protection will be supplied by automatic sprinklers. Operation is expected in the spring.

Unit No. 2 is being built at Eastport, Fla., and is to be similar in building and equipment to the Crossett plant. Production is planned for May.

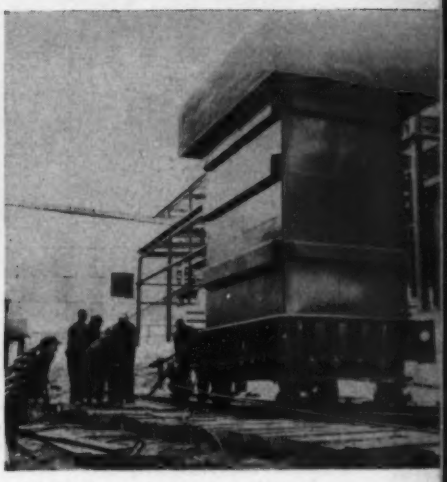
Each of the new plants will cost approximately $400,000. The additions will more than triple Simplex's productive capacity for asphalt laminated papers. The southern expansion is planned to take advantage of the production available from new high-speed low-cost production kraft mills operating in the area and also the nearby oil refineries from which asphalt will be available. Simplex operates an asphalt laminating plant at Adrian and a mill at Palmyra.

New Grinder Room in Operation at Fort Frances Mill



STOCK PIPING facilities on the lower level of Minnesota & Ontario Paper Co.'s new grinder room at Fort Frances, Ont. specialty paper and newsprint mill; the operation boasts 13 Shartle Bros. Machine Co. Waterous super hydraulic type magazine grinders using 4-ft. wood

ONE OF THE 5500-hp grinder motors supplied by Canadian General Electric Ltd. that will drive the 12 stones in the new Fort Frances grinder room; an existing 3500-hp motor drives the Insulite stone; construction of the multi-million dollar project began in 1952



WORKMEN WHEEL Fort Frances' new 30,000-kva three-phase transformer into place; power for the grinder room is supplied through Mando's 110,000-volt transmission circuit and is stepped down to 6600 volts; transformer and switches are located adjacent to a substation annex

Major Expansion Underway at Tileston & Hollingsworth

A $750,000 mill improvement program is now in progress at the Hyde Park (Boston) mill of Tileston & Hollingsworth & Co. The project is the second major expansion undertaken since the end of World War II.

Featured is the further rebuilding of the firm's largest paper machine. Rice Barton Corp. is handling the fourdrinier section and Beloit Iron Works the new headbox. General Electric Co. is replacing the electrical transformers and distribution circuits.

A modern humidification system is being installed in the finishing and cutting departments by Parks-Cramer Co. of Fitchburg, Mass. Also included in the expansion are a new chemicals preparation plant to supply surface sizing materials to the three paper machines; a rebuilt beater room; new cutting equipment, and a new steam boiler.

•

$1,000,000 Expansion at Chemical Paper Mfg. Co. to Include New 130-in. Machine

A 1954 expansion program recently announced by Chemical Paper Mfg. Co. in Holyoke, Mass., will include a new fourdrinier, air drying equipment, an enlargement of the machine room, and new laboratory facilities. Largest single improvement investment in the Holyoke paper industry in two decades, the project will require most of the year for completion.

The 130-in. fourdrinier that will trim 120 in. is to be supplied by the Bagley & Sewall Co. of Watertown, N. Y. It will be capable of speeds of 900 fpm and have an 80-in. wire.

The B & S unit will replace No. 2 machine, which was one of the original machines installed in the 1880s. The speed of the older unit is 250 fpm, and although it has been rebuilt at various times, will turn out less than a third of the quality light-weight paper of rag and sulfite content than its replacement.

200 hp vacuum pumps

A 40-in. suction couch roll will be a feature of the Bagley & Sewall fourdrinier, as will a 200 hp vaccum pump. The press rolls are to be pneumatically weighted; and Feeney dryers that will be used are said to be the first in Holyoke. Additionally, an overhead crane will be installed in the machine room. Actual paper machine installation will begin during the July shutdown, with operation expected in October.

Other improvements include the lengthening and widening of the machine room and provision for additional headroom. The paper firm will install an air dryer to be supplied by C. J. Merrill Co. of Portland, Maine. It will be the first such unit to be used in the mill. Also encompassed in the expansion is a laboratory that will serve both Chemical Paper and its associate mill, Crocker-McElwain Co. The lab will be devoted to research and quality control work.

Expansions Maintain Rapid Pace

Expansion and modernization projects continue the rapid pace set in the post-war years. Manufacturers and converters throughout the United States report progress on construction programs now underway, while new projects or planned expansions are being announced weekly:

At Savannah, Ga., **Southern Paperboard Corp.'s** $5,000,000 expansion program should be completed by April; new evaporators and digesters have been set up, a new boiler is under construction, a new turbine has been put into operation, and work is soon to be started on new refining equipment. . . .**Scott Paper Co.** is adding 210 employees at Everett, Wash., boosting the payroll to about 900; a new paper machine has been put through its trial runs, and a second machine is scheduled for operation this year.

Gardner Board & Carton Co. of Middletown, Ohio, has announced that a $200,000 Hydrapulper system has been ordered for its board mill in Lockland. The Hydrapulper is

NEW SIX-COLOR gravure press that is printing frozen food wraps at Marathon Corp.'s plant in Menasha, Wis.; a development of Kidder Press Co. Inc. of Dover, N. H., such presses have been operated at speeds in excess of 1000 fpm and handle cellophane and paper-backed foil, as well as all grades of paper and light board stock

manufactured by the Shartle Bros. Machine Div. of the Black-Clawson Co. Gardner directors have also approved a $25,000 appropriation for building a new type can-packaging machine. Originally developed by Manchester Machine Co., a Gardner subsidiary, the unit was designed for the brewing industry to process cartons for cans but will be adapted for packaging other canned products.

The 300-ton dissolving pulp mill being built at Ketchikan, Alaska, will be in operation well ahead of the June 1 date originally announced by the builders. The mill project—which will cost more than $40,000,000—is a joint undertaking of **Puget Sound Pulp & Timber Co.** and American Viscose Corp. . . . **St. Regis Paper Co.** has purchased for $1,217,507 the timber holdings of Raymond Lumber Co. of South Bend, Ore. More than 9,000 acres are included in the deal.

Robert Gair Co. Inc. has sold the factory property it formerly occupied at **Bogota, N. J., to Alford Cartons,** a subsidiary of Continental Paper Co.; originally built for occupancy by Bogota Paperboard Co., the property was acquired by Gair in 1932; the buildings will be used by Alford for the storage of paperboard and folding boxes; part of the property will eventually be used for plant expansion . . . . **Kimberly-Clark Corp's** new warehouse at Kimberly, Wis., was to be ready for occupancy this month. . . . **Hinde & Dauch Paper Co.** has acquired a 17-acre site in Kansas City, Kans., for the construction of a plant that will produce corrugated and solid fiber shipping boxes.

World Pulp Markets Called "Generally Healthy"

Further evidence of the generally healthy condition of world pulp markets has been reported by *The Financial Post,* Toronto. According to the paper, such evidence is shown by the first-quarter price increases being put into effect by Scandinavian producers; also, by Canadian production figures for the first 11 months of 1953.

Swedish pulp mills have announced an average increase of about $8 per ton for the first quarter of 1954. Norwegian and Finnish prices are also expected to be higher. The boosts are reported to reflect the continued strength of demand and a higher price for logs. Canadian prices are expected to show little change for the first quarter, with the exception of unbleached sulfite produced by most mills and unbleached kraft from British Columbia, each of which are going up $5 per ton.

In Canada the continued strong demand for pulp in both the domestic and export markets is reflected in production figures for the year to November 30. In that period total output was 8,164,993 tons, up 0.9 per cent from the same period in 1952. Domestic use of all grades of pulp has been up 1.3 per cent in the 11-month period.

•

Arizona Chemical Research Develops Wide Tall Oil Use

A new development for the utilization of pulp mill by-products has been announced by Arizona Chemical Co., jointly owned by International Paper Co. and American Cyanamid Co. Arizona Chemical is a major producer of crude and distilled tall oil and tall oil fatty acids and is the sole producer of tall oil rosins.

The project envisages the utilization of the wastes from International's seven Southern Kraft Division mills. Tall oil is the base of the products that will be made available through Arizona Chemical's research. And as a result of the program, the firm has started an extensive expansion of manufacturing facilities. The target date for completion is July 1, 1955.

Research has developed widening uses for tall oil in such various industries as paint and varnish, soap, printing inks, detergents, lubricants, disinfectants, etc. In some cases, tall oil products are used to upgrade quality products and to make paint, for instance, easier to apply. In the floor covering industry, tall oil will be offered as a binder for linoleum.

The planned expansion involves Arizona Chamical's plant at Panama City, Fla., which will be enlarged to nearly three times its present capacity. Tall oil has been available in crude form for many years. However, it has only been in recent years that it has been possible to break down the crude into its component parts and manufacture the highly purified derivatives.

•

Scott 1954 Pulp Supply Estimated at 420,000 Tons

Scott Paper Co. of Chester, Pa., has estimated that its pulp supply from its subsidiaries in 1954 will amount to approximately 420,000 tons.

According to a report by Smith, Barney & Co. of the New York Stock Exchange, the pulp tonnage will supply about 80 per cent of Scott's requirements, with substantial quantities being marketed. The balance of Scott's needs will be secured from various United States and Canadian suppliers under long-term contracts, supplemented by spot purchases.

Although the firm had invested in a small Canadian pulp operation in 1923, it was not until 1936 that Scott took steps toward substantially increasing its integrated pulp supply. Subsidiaries supplying pulp include Marinette Paper Co., Falls Paper & Power Co., Soundview Pulp Co., Brunswick Pulp & Paper Co., Coos Bay Pulp Corp., and Nairn Falls Pulp Co. Ltd.

•

Gaspesia Sulphite in Operation

Gaspesia Sulphite Co.'s new $3,500,000 bleaching plant at Chandler, Que., has gone into production. Designed capacity of the unit is 350 tons daily. The current operating rate is 250 tons.

The firm formerly produced only unbleached sulfite pulp, with an annual capacity of 82,500 tons. Because of sharp fluctuations in the price for the unbleached sulfite, the firm decided to switch to the bleached product, a more stable market item. Gaspesia is a wholly owned subsidiary of Anglo-Newfoundland Development Co.

•

Five Firms Sue Ontario Power Commission

Five pulp and paper companies in the Ottawa Valley have launched a $1,000,000 damage suit against the Ontario Hydro-Electric Power Commission.

The firms claim that hydro projects on the Ottawa River interfere with

THE *Right* SAVE-ALL FOR YOU IS THE SAVE-ALL THAT SAVES:

STOCK

With a well planned Bird Save-All system efficiency of fibre recovery is close to one hundred per cent. Valuable color or filler is retained in the system. The recovered fibre is returned for immediate re-use. Stock matched for color, size or filler stays in the system until it comes out in the finished sheet.

WATER

It stays in the system. This means substantial savings in filtration and pumping. Where warm water is used the fuel savings are considerable.

TIME

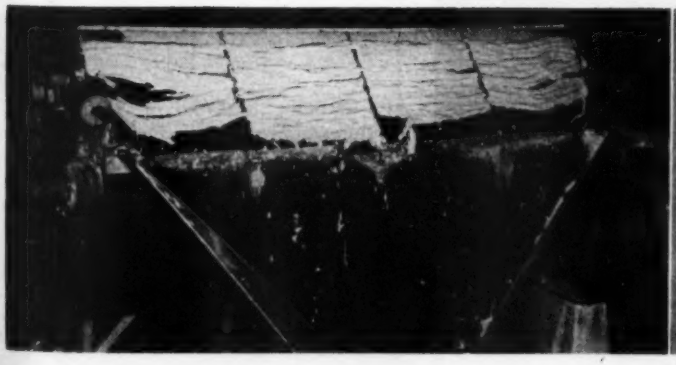
Wash-ups can be made in a small fraction of the time otherwise required. In many cases the entire system requires only a few hundred gallons and wash-ups take less than fifteen minutes.

TROUBLE

Much of the bother and expense of handling large volumes of wet or dry broke is eliminated. Changes of color, filler, weight or deckle are quickly made, without waste.

MONEY

Besides the above operating economies, the Bird Save-All is designed to deliver recovered stock at lowest cost per pound.



THE **BIRD SAVE-ALL**

BIRD MACHINE COMPANY

South Walpole, Massachusetts

the stream's normal flow. They say that they can no longer depend on the river to float logs downstream but must hire or buy tugs and construct docks, harbors, etc.

The companies concerned in the court action are the E. B. Eddy Co. Ltd., Canadian International Paper Co., Consolidated Paper Corp. Ltd., Gillies Bros. & Co., and Upper Ottawa Improvement Co.

•

Canada Fears Loss of Latin American Market

Chile's plan to spend $300,000,000 over the next 12 years to develop her pulp and paper industry may mean a loss of the Latin American market to Canadian newsprint and chemical pulp producers. The view was expressed recently by M. R. M. Dale, Canadian commercial secretary at Santiago.

"At present, Canadian exporters sell to Chile about $1,500,000 worth of newsprint and chemical pulp a year," Mr. Dale declared. "If Chile carries through developments now being studied, Canada may face the gradual loss of this newsprint market and possible competition.

"On the other hand," he continued, "the building up of a pulp and paper industry in Chile should mean opportunities for Canadian manufacturers of papermaking machinery and equipment, and for skilled Canadian technicians and managers."

Two Mill Projects Rumored for British Columbia

E. G. Rowebottom, British Columbia's deputy minister of trade and industry, has declared that United States interests are contemplating construction of a pulp mill in the north central section of the province. He said that the mill would manufacture pulp for export and would probably cost close to $15,000,000.

In a similar announcement, Robert Sommers, lands and forests minister, said recently that a $30,000,000 pulp mill may be built near Victoria early next year. The site of the kraft pulp mill would be on southern Vancouver Island.

•

Canadian News Notes

The Great Lakes Paper Co. Ltd. has sold its substantial stock interest in Northern Wood Preservers Ltd. to the management and shareholders of the latter firm. Great Lakes originally acquired its holdings in the tar and chemical firm in 1950 in an effort to accomplish maximum utilization of timber resources . . . . The newly expanded bleached sulfate pulp plant of **MacMillan & Bloedel Ltd.** at Nanaimo, B. C., has more than doubled the capacity of the original unit. Output has reached a daily 500 tons, and total capacity production of 600 tons is expected shortly . . . . **Anglo-Canadian Pulp & Paper Mills Ltd.** has now acquired nearly all the outstanding shares of Dryden Paper Co. Ltd. under last summer's offer to purchase.

•

Management Institute Honors 11 Paper Companies

Eleven paper firms have been certified as "excellently managed" by the American Institute of Management. Seven of them received the award for the fourth consecutive year: Crown Zellerbach Corp., San Francisco; the Champion Paper & Fibre Co., Hamilton, Ohio; Great Northern Paper Co., Boston; Marathon Corp., Menasha, Wis.; West Virginia Pulp & Paper Co. and St. Regis Paper Co., both of New York, N. Y., and Scott Paper Co., Chester, Pa.

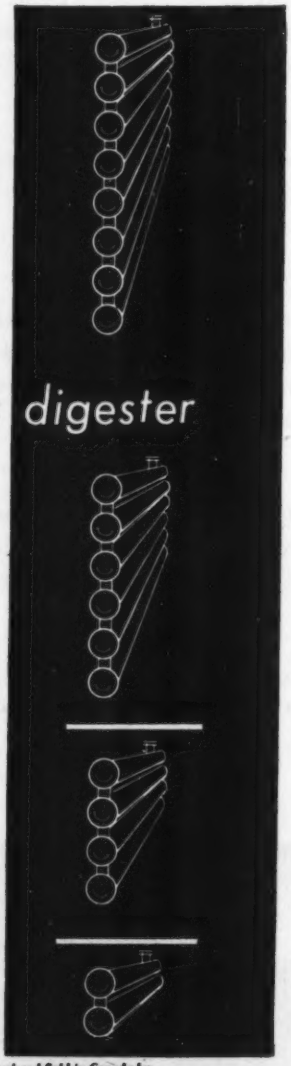
For the third time in as many years International Cellucotton Products Co., Chicago, and Kimbery-Clark Corp. of Neenah, Wis., received the AIM honor, while Brown Co. of Berlin, N. H., obtained it for the second time. Olin Industries Inc. was termed "excellently managed" for the first time by the Institute.

According to Jackson Martindell, president of the Institute, only 348

a size for every mill

CHEMI-PULPER®

continuous digester



Units from 2 to 8 tubes capable of producing up to 100 tons of high grade pulp per day.

CHEMI-PULPER continuous digesters are producing quality pulp for mills making products ranging from board to bleach grades.

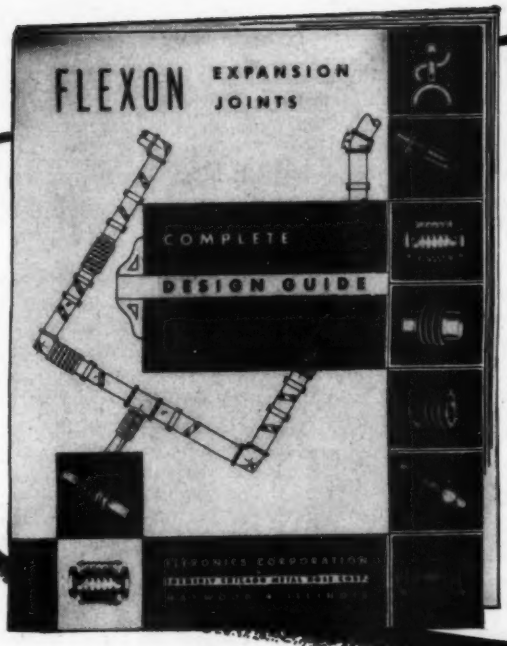
Write for Bulletin C2.

Manufactured and Sold in Canada by
THE ALEXANDER FLECK LIMITED, OTTAWA, CANADA.

PANDIA

PANDIA INC.

122 EAST 42nd STREET • NEW YORK 17, N. Y.



THIS NEW AUTHORITATIVE GUIDE TO PIPING MOTION CONTROL SHOULD BE AN IMPORTANT PART OF YOUR BASIC ENGINEERING FILE

The New FLEXON Expansion Joint Design Guide

THE FLEXON EXPANSION JOINT LINE-UP

Flexonics Corporation manufactures a complete line of corrugated type stainless steel and copper expansion joints in Free-Flexing (low pressure), Controlled-Flexing (high pressure) and Flexoniflex (extremely high pressure) units. Sizes range from ½" to 48". Units are available for temperatures from —400° F., to 1600° F., and for pressures from vacuum to 5500 psi. Write for further information or see the Flexonics catalogs in Sweet's Plant Engineering File, Chemical Engineering Catalog or The Refinery Catalog.

Now at last, comprehensive, up-to-date information on the absorption of motion in piping has been gathered together in one easy-to-use booklet. In its new Expansion Joint Design Guide, Flexonics Corporation offers an authoritative handbook of piping design and layout! Included in the booklet are thorough discussions of types of motion, design considerations pertaining to the physical characteristics of expansion joints and anchoring and guiding, typical piping layouts, computation of thermal expansion, safety factors and many other vitally important factors in piping design.

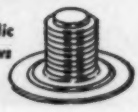
Much of the information presented is available nowhere else; all of it helpful to anyone responsible for the design, installation or maintenance of piping. Copies of the Flexon Expansion Joint Design Guide are available without charge. Write for your copy, today.

Flexonics Corporation EXPANSION JOINT DIVISION 1311 S. THIRD AVENUE • MAYWOOD, ILLINOIS

FORMERLY CHICAGO METAL HOSE CORPORATION

In Canada: Flexonics Corporation of Canada, Ltd., Brampton, Ontario

Flexon identifies products of Flexonics Corporation that have served industry for over 50 years.



firms in the United States and Canada —out of the 3000 leading concerns whose methods were studied—were found eligible to receive the designation for 1953.

•

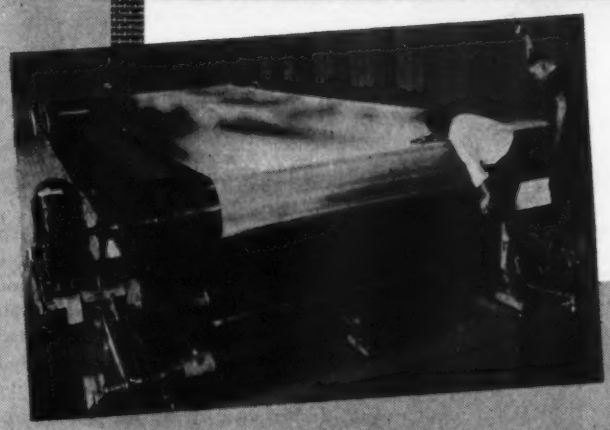
Lack of Forest Fire Insurance Attacked

The growing of timber as a private enterprise is being handicapped by the general unavailability of forest fire insurance, according to H. B. Shepard, forest economist of the Federal Reserve Bank of Boston.

Addressing the annual meeting of the American Society of Mechanical Engineers, he said that the extent to which fire insurance is being placed on forest properties is "negligible" because of the reluctance of companies to write this type of insurance. Mr. Shepard continued: "The evidence points to the prospect that, if forest fire insurance is to become a going business in any real sense, it will be because the forest owners organize their own insurance carrier or carriers."

Forest fire insurance is one of the requirements in the creation of conditions favorable to good forest management, he concluded. The protection of capital investment is available to other types of businesses.

Two of the Men Behind Eastwood Wires



FINAL EXAM

Here James Baney and Clarence Reed are making a final, inch-by-inch examination of a large fourdrinier wire. Though this is a final check, it is only one of many given it at every stage of its manufacture, from the casting of the alloys in our own foundry to the stretching table inspection shown above.

Because the Eastwood-Nealley plant is a *completely integrated* operation, every wire we ship has undergone thorough and continual analysis, control and testing from the raw metals to your finished fourdrinier wire ready for quality paper production.

We are proud to say they are *truly ours* — "from ingots to fourdrinier wire".

EASTWOOD-NEALLEY CORPORATION
Belleville, N. J.

U. S. Wood Pulp Imports
January-November, 1952 and 1953

(In short tons)

	1953	1952	Per Cent Incr.
Canada	1,482,925	1,434,449	3
Sweden	302,135	149,437	102
Finland	148,399	115,995	28
Norway	36,089	16,331	121
Germany	588	169	248
France	211	121	74
Austria	9,799	1,257	680
TOTAL	1,980,146	1,717,759	15

Source: U. S. Bureau of the Census.

•

National Forest Harvest Sets Three-Month Record

The timber harvest from national forests between July 1 and September 30 was a record 1,817,274,000 board ft., according to a report from the Forest Service of the U. S. Department of Agriculture. This surpassed the 1952 harvest for the same period by 189,460,000 board ft.

The 1953 cut for the July-September period was valued at $22,797,018, while that cut during the same period in 1952 was valued at $22,715,548. The cut for the period included enough saw timber to build more than 171,450 one-family cottages, enough pulpwood to produce 23,000,000 tons of pulp; also, 29,365,000 board ft. of miscellaneous products such as fuelwood, poles, fence posts, and railroad ties.

•

Wisconsin Firms Continue to Lead Way in Modern Forestry

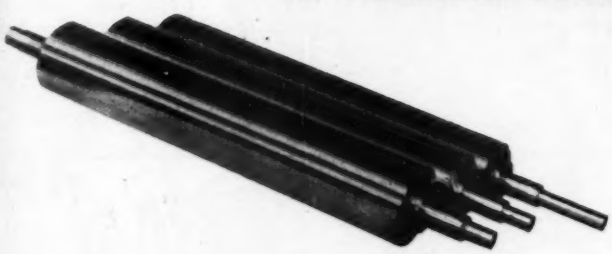
Wisconsin pulp and paper firms are continuing their intense interest in modern forestry and the latest in woods management.

Kimberly-Clark Corp. will plant 100,000 additional spruce trees in northern Wisconsin. The seedlings are to be acquired from The Minnesota nursery of North Star Timber Co., a K-C subsidiary. In a research project, Kimberly-Clark is studying the regeneration of the aspen tree—the most prolific in America. The firm is planning the increased use of aspen for pulpwood.

Marathon Corp.'s decision to enter the forest management field with its own timber holdings has received the blessing of the Wisconsin State Conservation Commission. The firm plans the management of more than 32,000 acres as the state's 12th industrial forest. (Marathon's newly acquired subsidiary, Northern Paper Mills, has had extensive forest holdings for some years.)

A profitable method of thinning forests has been worked out on a cooperative basis by **Mosinee Paper Mills Co.** and Koppers Wood Preserving Co., manufacturer of fence posts. The

In Potlatch Forests' New High-Speed Mill



WELDCO ROLLS

Help Increase Production Of Bleached Kraft Paper

Today's high-speed kraft paper production calls for the finest, newest, most efficient equipment. So when Rice-Barton Corp. designed Potlatch Forests' new 196" machine, WELDCO Stainless Steel Roll Covers were specified for the Wire, Wire Stretch, and Breast Rolls.

You'll find WELDCO—Covered Rolls in many other mills, too, because they offer maximum corrosion-resistance, have superior wettability, reduce friction, increase felt life, and lessen wear on fourdrinier wires. They give years and years of economical service, with a minimum of maintenance.

Both new and old rolls can be covered with Stainless Steel, Monel, Nickel, Inconel, or other alloys, through the patented WELDCO "Pressure Welding" process. For your next machine — whether new or reconditioned — be sure to specify WELDCO Rolls. Ask your paper machinery builder about them, or contact . . .

WELDCO

THE YOUNGSTOWN WELDING & ENGINEERING COMPANY

3715 OAKWOOD AVENUE · · YOUNGSTOWN 9, OHIO

Safety Management Studied at Chicago

SAFETY EXPERTS from the pulp and paper industry studied new management techniques during an advanced course sponsored in Chicago recently by the National Safety Council; above, Franklin Pater, NSC staff representative for the Pulp and Paper Section, shows the latest Council posters to (l to r): Clifford L. Sheckler, safety engineer for Johns-Manville Corp.; C. Alton Cocke, safety director for Riegel Carolina Corp.; Francis H. Wagner, director of safety for the Mead Corp.; W. L. Godshall, safety director for International Paper Co.; W. M. Allison, safety director for B. C. Lumber Manufacturers Association, and Ralph E. Myers, safety supervisor for the Mead Corp.

program has been put into effect on the 77,000-acre Mosinee industrial forest in northern Wisconsin and is being hailed as an answer to some of the state's forest problems.

Pulp mills cannot economically use trees less than 4 in. in diameter, and most of the northern stands contain thousands of such stunted specimens. Frank Fixmer, Mosinee's woodlands chief, devised a plan whereby the smaller trees would be sold to Koppers, which has a plant close to the paper mill's stands. Mr. Fixmer suggested that Koppers use jack pine posts for fencing, and that Mosinee supply enough material for 300,000 such posts annually. Under the plan, the 25- to 30-year stands will be thinned lightly in the next five years.

•

Hampshire Paper Co. Dissolved

Hampshire Paper Co. Inc. of Springfield, Mass., for 87 years a leader in the fine paper business, has been dissolved. Its various departments have been purchased by three local firms.

Pratt & Austin Co. has taken over the famous Hampshire papeterie line and will continue the conversion of several widely known old watermarks. American Pad & Paper Co. has acquired the Old Hampshire Bond typewriter line. White & Wyckoff Mfg. Co. has bought the steel dies used to engrave stationery for colleges and schools.

Hampshire was organized in 1866 by John Hayward Southworth, who built a mill in South Hadley Falls. In 1935 the manufacturing operations were suspended and the plant sold to Stevens Paper Co.

News Notes

St. Regis Paper Co. has announced that the name of its plastics subsidiary, Cambridge Molded Plastics Co. of Cambridge, Ohio, has been changed to Cambridge-Panelyte Molded Plastics Co. . . . Charles Sage, vice president of **Kimberly-Clark Corp.**, has declared that pulp consumption in Wisconsin will continue to grow if pulp mills can produce in increasing quantities from local forest materials. He predicted that the state can build its annual pulpwood consumption from less than 2,000,000 cords to more than 3,000,000.

Sisalkraft Co. has announced a merger with its manufacturing division, American Reinforced Paper Co. The organization, which makes a line of waterproof papers, insulation and box tape products, will be renamed **American Sisalkraft Corp.** . . . **Nekoosa-Edwards Paper Co.**'s Nepco Foundation will make a maximum of four new awards this year under its scholarship program for children of employees and of Nekoosa and Port Edwards families. Each is for $750.

U. S. Paper and Paperboard Production

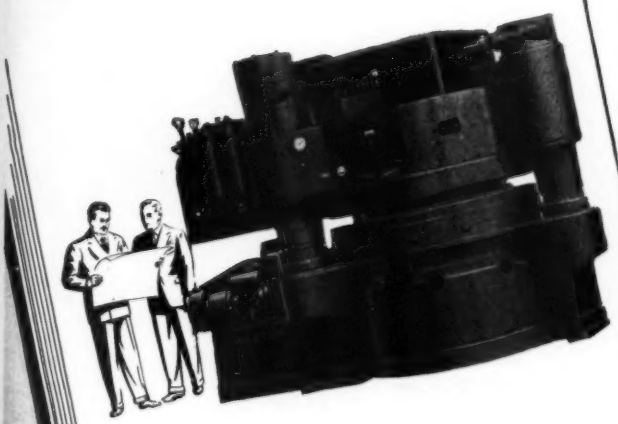
	Nov. 1953 (tons)	Oct. 1953 (tons)	Nov. 1952 (tons)	Total 1952 (1,000 tons)	Total 1947 (1,000 tons)
Paper and Board, total	2,186,390	2,408,819	2,103,797	24,423	21,102
Paper, Total	949,280	1,032,734	885,555	10,898	10,693
Newsprint	91,571	96,023	85,956	1,109	833
Groundwood paper (uncoated)	61,685	69,033	65,017	806	821
Printing and converting (coated)	102,591	106,095	86,757	1,096	
Book paper (uncoated)	131,797	146,292	125,598	1,482	2,208
Fine paper (writing, cover and text, bristols, thin paper and other)	106,106	115,846	98,393	1,295	1,172
Coarse paper (unbleached, kraft, glassine, greaseproof, vegetable parchment and other)	290,817	314,984	269,137	3,238	2,903
Special industrial paper	31,849	35,028	30,666	396	289
Sanitary tissue stock	102,763	117,544	96,214	1,148	894
Tissue paper	19,709	21,418	18,062	209	195
Absorbent paper	10,392	10,471	9,755	118	100
Paperboard, total	1,021,030	1,121,581	985,750	10,772	9,187
Containerboard, total	574,323	625,782	536,549	5,766	4,943
Liners	397,806	419,343	364,613	3,902	3,293
Corrugating material	154,784	177,094	147,010	1,583	1,370
Container chipboard	21,733	29,345	24,926	282	280
Bending board	288,697	314,413	279,428	3,144	2,249
Non-bending board	73,032	90,133	74,367	783	595
Special paperboard stock	79,003	83,430	89,199	1,009	1,307
Cardboard	5,975	7,823	6,207	69	92
Wet machine board, total	10,524	12,826	11,505	139	150
Construction paper and board, total	205,556	241,678	220,987	2,614	2,349
Construction paper	96,752	125,263	106,059	1,299	1,277
Hardboard and insulating board	108,804	116,415	114,928	1,315	1,072

Source: U. S. Department of Commerce.

Total 1947 tons)
21,102
10,693
833
821
2,208
1,172
2,903
289
894
195
100
9,187
4,943
3,293
1,370
280
2,249
595
1,307
92
150
2,349
1,277
1,072

IS YOUR MILL LISTED HERE?

BLUE BOOK of PAPER MILLS



NORTH AMERICAN EDITION
CURLATOR INSTALLATIONS

CANADA

Anglo-Canadian Pulp & Paper Mills, Ltd.
Gaspesia Sulphite Company Ltd.
Howard Smith Paper Mills Limited
The Ontario Paper Co., Limited
Price Bros. & Co., Ltd.
Quebec North Shore Paper Co.

UNITED STATES

Champion Paper & Fibre Co.
Marathon Corporation
The Northwest Paper Company
Stevens & Thompson Paper Co.

(continued)

HERE'S WHY...

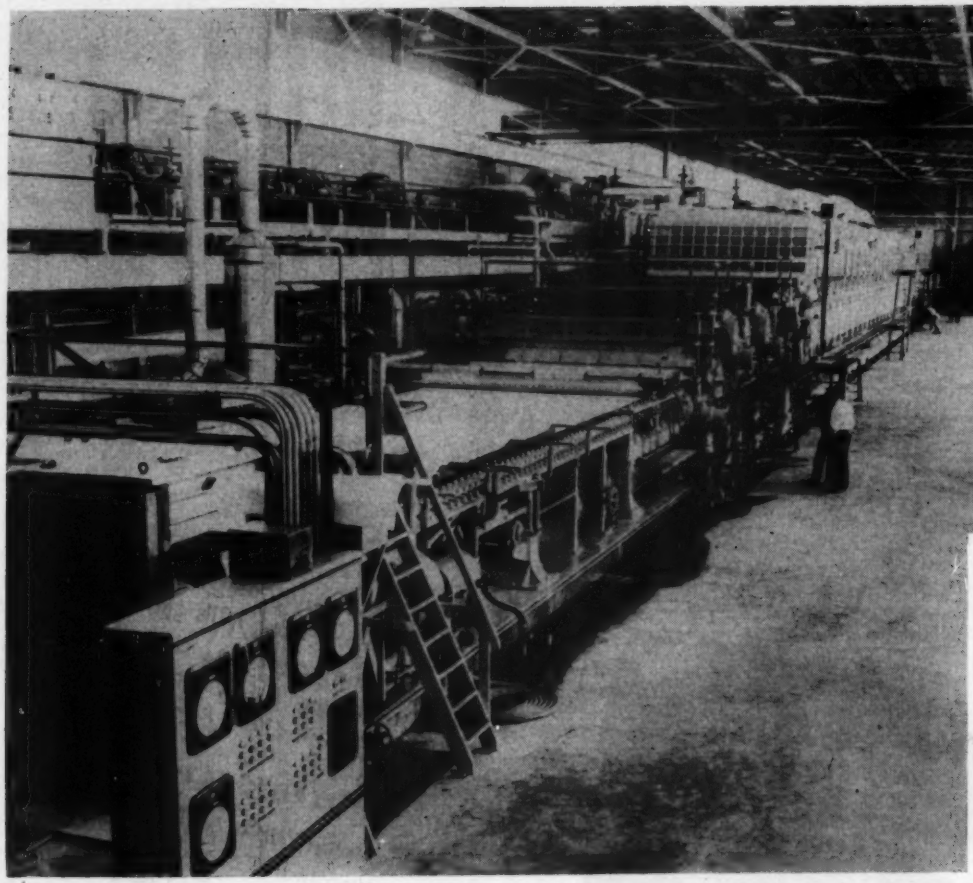
These MILLS Installed Curlators

- to Increase Pulp Yield 10% or More.
- to Effect Savings in Steam, Sulphur and Limestone without Change in Product Quality.
- to Eliminate All Fibre Bundles and Reduce Dirt without Loss of Freeness or Cutting of Fibres.
- to Improve Pulp Quality.
- to Cut Costs.

If your mill hasn't investigated the Curlator... seen how Curlation saves pulp wood and improves paper quality... been shown how Curlators pay for themselves in less than a year, WRITE us at once and let us show you without obligation.

CURLATOR† *Corporation*
EAST ROCHESTER, NEW YORK

†T.M. Reg.—Curlator Corporation, Rochester, N. Y.



Pulp machine wet end is a 156-in. Rice Barton fourdrinier operating at about 300 fpm; headbox is of wood construction

H. W. Morgan
Vice President

New kraft pulp mill integrated into Weyerhaeuser's operations

K. F. HARRIS

PAST EXPERIENCE has been a large factor in the ultimate choice of design of the new Everett, Wash. kraft pulp mill of Weyerhaeuser Timber Co. The firm's experience is that of having now put five mills into production, including the sulfite mill at Everett; a kraft mill at Springfield, Ore., and a sulfite mill and a kraft mill at Longview, Wash. Outstanding features of the new mill are the facilities that make it different from previous mills and those things that have been incorporated because past experience has shown them to be practical.

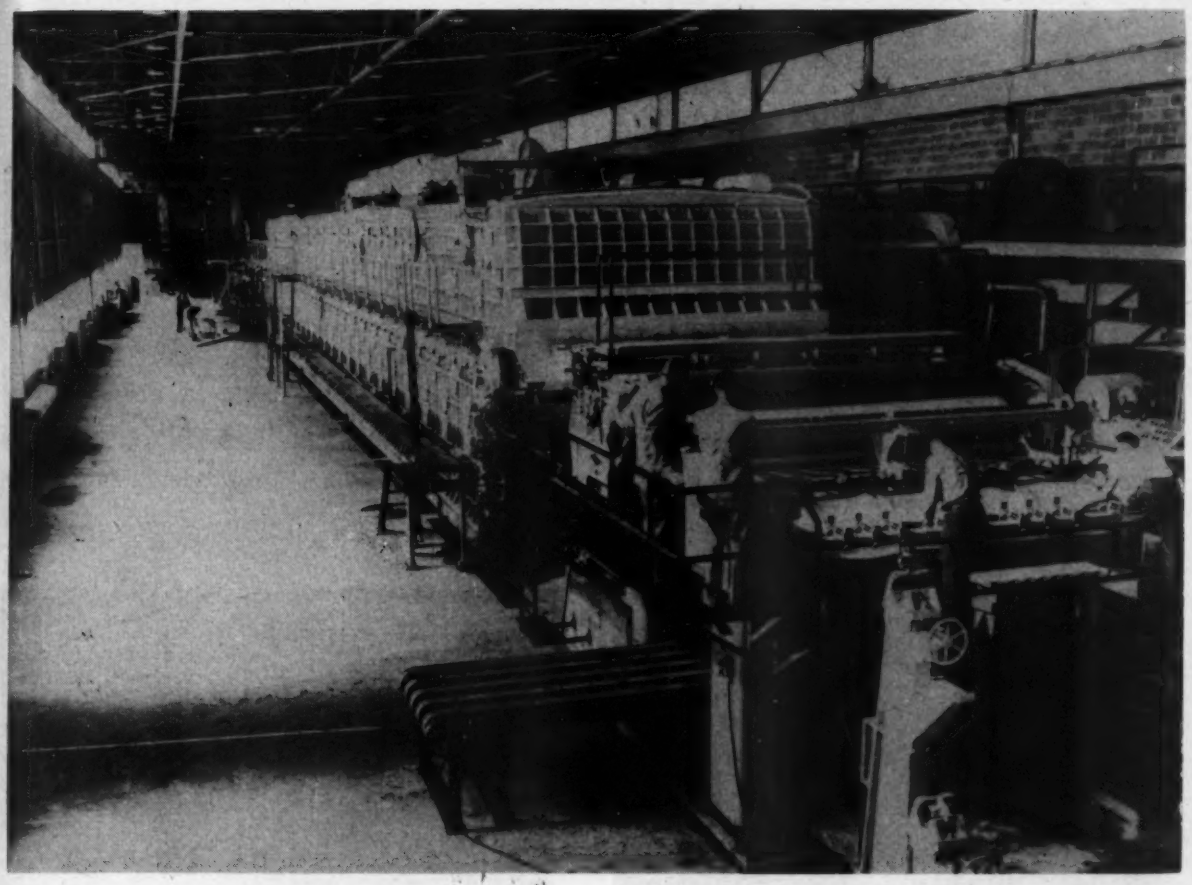
One of the first features of the mill is its plan for completely integrated utilization of all the forest crop, of sawmill waste, and of the operating

▶ The new mill fits into a plan of completely integrated utilization of forest timber, sawmill waste, and operating facilities designed for maximum economy.

▶ Wood supply consists entirely of chipped sawmill waste, which makes it possible for the mill to operate without woodyard chipping facilities.

▶ Waste water, discharged through a specially designed all-wooden pipeline into a settling basin on Smith Island, is released into the river on outgoing tides only.

▶ The latest in odor elimination research has been put to work. The finishing room is one of the most modern and automatic. The water filtration plant is completely automatic.



Minton vacuum dryer has a Drew Engineering ventilating system; the Lamb-Grays Harbor layboy is first stage of a fully automatic finishing room

facilities in the mill. Integrating is now a by-word in most large West Coast operations. These mills, depending on large and often overmature timber for their raw materials, have had to consider manufacturing processes as supplementary to one another rather than as independent operations. It is, therefore, a result of past experience that the new Everett mill is designed from the very beginning to fit into the existing pattern of forest and mill production in the Everett area.

Pulpwood Supply

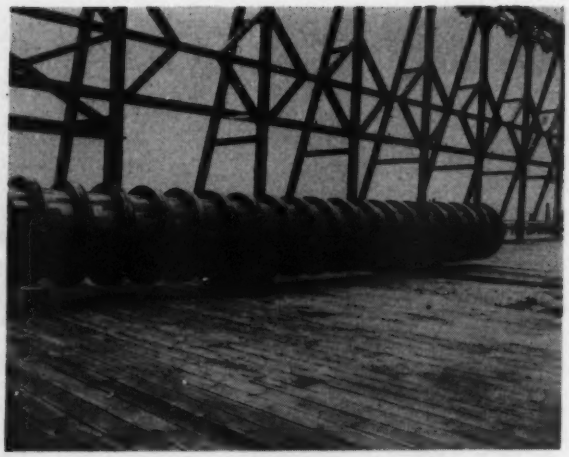
The wood supply consists of mill residue, ends, slabs, etc. from the company sawmills. Each of the sawmills supports a certified tree farm which, if successfully protected from fire, insect attack, and disease, is capable of maintaining the sawmill's output forever. Not a single extra tree will have to be felled to support the production of the Everett kraft mill; that material which has previously been used for hog fuel in the four company sawmills will now be diverted to the chippers for pulp chips. These sawmills are the B and C mills in Everett and those at Enumclaw and Snoqualmie Falls. A quarter-mile Link-Belt Co. conveying system with over 12,000 ft. of belting, supplied by United States Rubber Co. and claimed to be the longest of its kind ever installed, collects the chips from the B and C mills and delivers them to the five chip storage silos near the kraft mill entrance. A lesser volume of chips from the other two mills is transported by rail and handled by a special conveyor system at the mill. As the sawmills operate on a five-day week, chip storage has to be adequate for the seven-day pulp operation.

Behind this supply is the Vail-McDonald Tree Farm with more than 500,000 acres of western-central Washington timberland managed on an 80- to 100-year rotation perpetual yield basis. Harvesting in this area is of the most modern and mechanized type. The tree species are predominantly Douglas fir, hemlock, spruce, and cedar. Power saws and power equipment for yarding and loading onto trucks speed the logs to a railhead, where whole truckloads are reloaded onto rail cars. Logs are then rafted and towed from the log dump at South Bay near Olympia to the Everett mills for barking. The hemlock logs are used largely in the sulfite pulp mill, with other species going to the sawmills and kraft pulp mill. If there is to be a radical change in the cut from the sawmills, the pulp mill operators are notified.

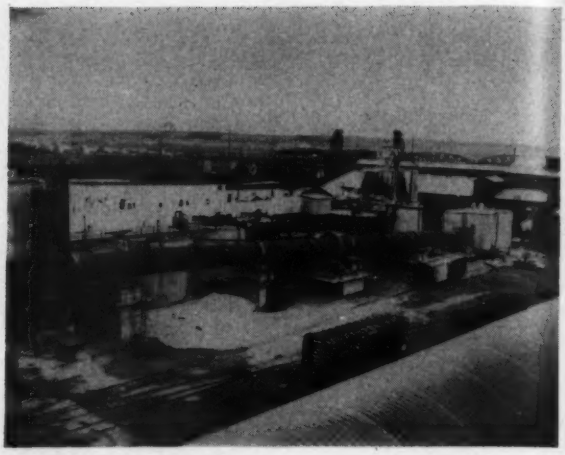
Barking of all logs makes it possible to use all the sawmill residue for pulp chips without further barking treatment. The Enumclaw and Snoqualmie Falls mills have their own timber supplies from separate tree farms. Facilities are also provided for the handling of chip supplies from smaller mills by truck. It is also possible to draw chip supplies from the Everett sulfite mill should the necessity arise. Thus the Everett kraft mill is operating entirely without a woodroom or other chip manufacturing equipment.

Other highlights

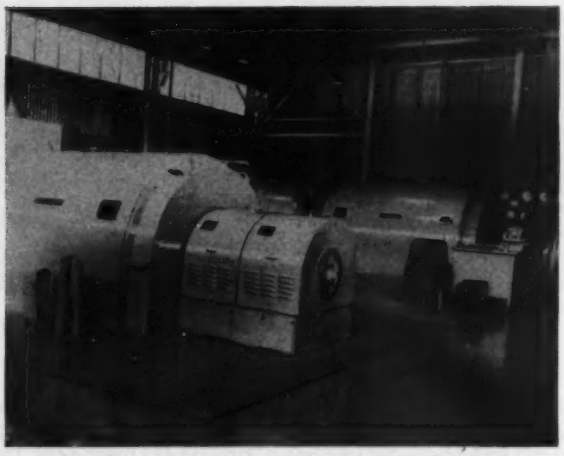
Another form of integration which has been brought about by careful design is the way in which pulping,



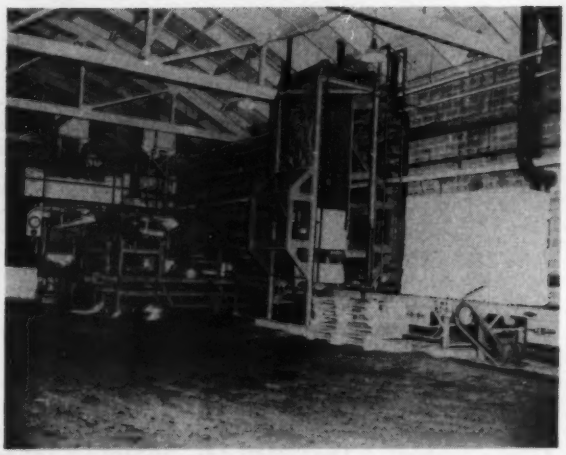
Specially constructed all-wood pipe is laid in a channel in the bed of the Snohomish River; it carries mill wastes to settling ponds



Much of the plant is set out in the open—a feature of reduced building costs

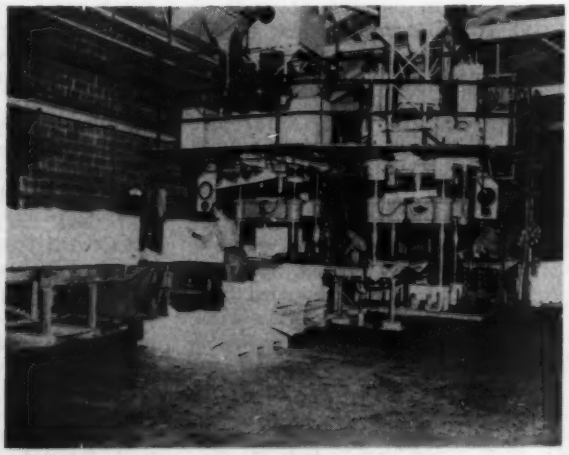


Two Westinghouse turbo-generators provide a 12,500-kw power source for the Everett bleached kraft mill; oil and waste liquor are burned for fuel

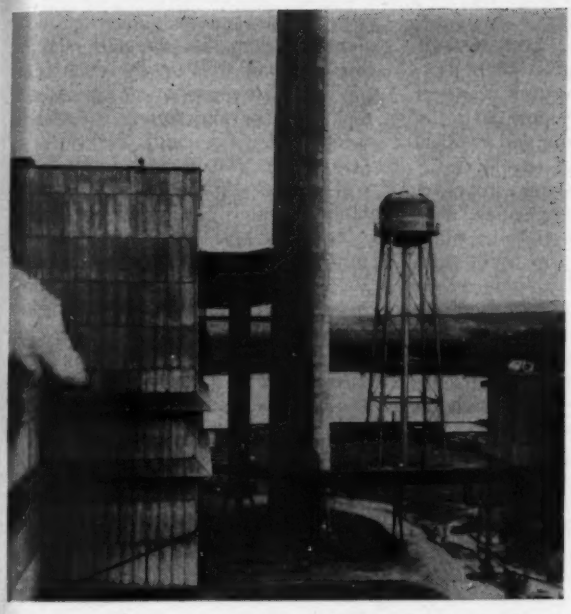


Automatic baling, tieing and stacking machinery cuts manpower to the minimum; stacker gives the warehouse fork lift truck its exact load requirement

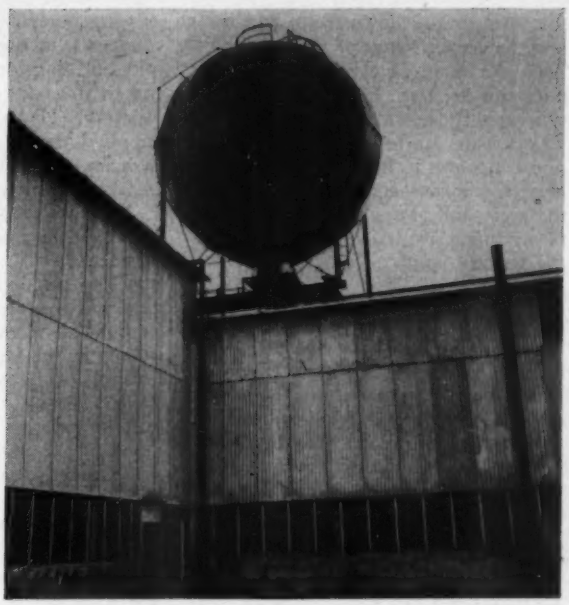
Windows have been eliminated in favor of louvers to reduce cleaning and maintenance costs; all construction is directed towards long-term operating economy



Two 1000-ton hydraulic presses supplied by Washington Iron Works of Seattle are large elements in the operation of a nearly automatic finishing room



Recovery and power furnace vent into this single stack, as does the lime kiln; portion below the combined flue entrance stores up to 400 tons of salt cake



Odor elimination is carried out to the farthest practical degree, as based on research at the Springfield, Ore. mill; sphere on roof provides special stage in this process

bleaching and digesting processes have been installed on the same floor of one building. In addition, screening is done on a mezzanine level slightly below the other operating floor. This has the effect of allowing the operating personnel to overlap in their duties and to help each other when the need requires it.

Pioneer research done at the Springfield mill on odor elimination has been put to work at Everett. While it is not always possible to achieve 100 per cent odor elimination, every possible care has been taken to control this situation. Blow gases are trapped and destroyed by burning or recovery, and a special oxidation tower has been added to further remove solids from the gases before release to the atmosphere.

The staggering costs of pulp mill construction has been probably the largest contributing factor towards design changes of the past decade. The new Everett mill is right in stride with its severe but practical economy in construction. Engineers, who see fewer and fewer buildings and more and more equipment built to fend for itself in the weather, will not be surprised to know that there has been a move to bring everything possible out-of-doors. Recovery, liquor-making equipment, and the recausticizing plant fall largely into this category, along with liquor storage and stock storage for the bleach plant. The buildings themselves have been designed for the minimum of upkeep cost. Construction is primarily steel with transite; windows have been replaced with translucent glass, and horizontal louvers provide ventilation. This has circumvented the need for window cleaning, putty maintenance, and trim painting.

The all-important water supply is drawn from the Snohomish River at a pumping station six miles upstream to avoid tide water. This 25,000,000-gal. daily output would be enough to supply a residential population of over 275,000. The water supply line was installed by American Pipe & Construction Co. The filtration plant is completely automatic, being serviced only by one oiler and one man giving a periodic check through the day. The night check is conducted by the shift chemist. This plant was installed by Northwest Filter Co. Water treatment for chemical control in process consists basically of lime, alum, and chlorine.

Another feature of the mill plan is the waste effluent disposal system installed by General Construction Co. of Seattle. About the only types of waste left in such a mill as the kraft mill at Everett are a few chemicals in the flue wastes and the used water. No doubt, someday, research and economics will even permit reduction of these losses. Meanwhile, the waste water disposal has been soundly and safely handled by discharging the water through a specially designed all-wooden pipeline under the Snohomish River into a earthenwork settling basin on Smith Island. The basin will retain more than two days' water production. Water from this basin is released only on outgoing tides when

Key operating personnel at the new Everett kraft mill are (l to r) L. G. Willins, superintendent; C. L. Carns, plant engineer, and John McEwen, technical director

the river sweeps downstream and out into the deeper waters of Puget Sound. Both the State Department of Fisheries and the State Pollution Commission were consulted to insure that mill wastes were far below the concentration dangerous to marine life. In any case, the mixed alkaline waste from the kraft mill and acid waste from its bleach plant neutralize each other in the settling pond.

Effect on community

Just over two year ago the mill construction began on what had previously been a lumber mill and craneway. Construction was under the direction of G. F. Alcorn and was done by Hoffman Construction Co. of Portland. The plant will employ about 200 men and women and will produce about 250 tons of bleached sulfate pulp in a 24-hour day. The total annual payroll will probably exceed $1,000,000, which statistically will support indirectly between 1,333 and 1,600 people in a community. This requires 400 homes and will bring 427 automobiles into the community. Transportation facilities will benefit to the tune of $70,000 annually, and the produce of 80,000 acres of farm land will be utilized. These figures when projected to the whole pulp and paper industry hold a staggering significance.

Men to run the mill come from other Weyerhaeuser mills to take more responsible and highly paid jobs, thus bringing new employees into the organization to replace them.

Design-economy featured throughout

In the mill itself the design economy becomes very apparent. The six welded digesters, each with a 10-ton capacity, are situated close to other operating stages for efficient control. These are lined with carbon brick against the particularly corrosive action of Douglas fir pulping. Digesters were constructed by Chicago Bridge & Iron Co. and were lined by Stebbins Engineering & Mfg. Co. Installation of the digester circulating systems, relief strainers and liners was made by Electric Steel Foundry Co. Instrumentation was largely the work of The Foxboro Co. and Minneapolis-Honeywell Regulator Co. Modern console-type control panels have been used on the washer floor of the bleach plant.

Each operator does his own technical control so that there is quality control at all times in all stages of manufacture. The testing laboratory makes spot checks and does all the other testing that is not convenient to the operator.

The blow tanks were constructed by Consolidated Western Steel Corp., as were other steel tanks. A surface condenser is used for heat recovery with the non-condensible solids passing to the odor elimination phase of recovery. Hydraulic Supply Mfg. Co. supplied the evaporator and condensers for the mill, and the Dorr Co. installed the liquor-making equipment. C. C. Moore & Co. supplied the Babcock & Wilcox Co. power boiler which operates on oil. Hog fuel is not available, as this is used entirely at the lumber division of the integrated operation. The recovery boiler was installed by the same firm. Combustion control equipment was installed by Bailey Meter Co. Two Westinghouse turbo-generators with a total capacity of about 12,500 kw provide the electrical power for the mill.

The 275-ft. recovery stack serves the combined functions of venting for both furnaces and the lime kiln. The combined flues into the stack are led in at a point well up the stack leaving the base portion for about 400 tons of salt cake storage. Custodis Construction Co. built the stack; a Cottrell electrostatic precipitation system was installed by Western Precipitation Corp.

Salt cake and lime conveyors were installed by Holly Pneumatic Systems Inc., and Link-Belt installed the lime handling equipment as well as such other installations as rotary plate chip feeders and conveyor belt equipment. Oliver United Filters Inc. installed the lime mud filter system. The lime kiln is a Traylor Engineering & Mfg. Co. installation.

Facilities are provided for 100 tons of pulp both before and after the bleach plant stage of manufacture.

Everett equipment and suppliers

Freight Elevators	American Mfg. Co.
Combustion Control Equipment	Bailey Meter Co.
Agitators	James Brinkley Co.
Wood Tanks and Wood Pipe	Brooks Lumber Co.
Traveling Water Screen	Chain Belt Co.
Digesters and Water Storage Tank	Chicago Bridge & Iron Co.
Fabricated Steel Tanks	Consolidated Western Steel Corp.
Recovery Stack	Custodis Construction Co.
Liquor Making Equipment	Dorr Co.
Ventilation Equipment	Drew Engineering Co.
Bridge Cranes	Ederer Engineering Co.
Digester Circulating Systems, Relief Strainers and Liners	Electric Steel Foundry Co.
Electric Motors, Controls, Substations	General Electric Co.
Salt Cake and Lime Conveyors	Holly Pneumatic Systems Inc.
Evaporators and Condensers	Hydraulic Supply Mfg. Co.
Washers, Screens, Bleach Plant Equipment	Improved Machinery Inc.
Air Compressers	Ingersoll-Rand Co.
Pumps	Bingham Pump Co.; Byron Jackson Co.; Worthington Corp.
Instrumentation	Foxboro Co.; Minneapolis-Honeywell Reg. Co.
Finishing Room Equipment	Lamb-Grays Harbor Co.
Rotary Plate Chip Feeders, Conveyor Belt Equipment and Lime Handling Equipment	Link-Belt Co.
Weightometers	Merrick Scale Mfg. Co.
B&W Power Boiler and Recovery Boiler	C. C. Moore & Co.
Vacuum Pump	The Nash Engineering Co.
Filter Plant Equipment	Northwest Filter Co.
Lime Mud Filter	Oliver United Filters Inc.
Minton Dryer	Rice Barton Corp.
Chlorination Tower Equipment	Sandy Hill Iron & Brass Works
Concrete	H. O. Seiffert Co.
Hydrapulper	Shartle Bros. Machine Div., The Black-Clawson Co.
Tile Lining	Stebbins Engineering & Mfg. Co.
Scales	Toledo Scale Co.
Lime Kiln	Traylor Engineering & Mfg. Co.
Conveyor Belting	United States Rubber Co.
Sprinkling Systems	Viking Automatic Sprinkler Co.
1000-ton Hydraulic Presses	Washington Iron Works
Speed Reducers	Western Gear Works
Cottrell System	Western Precipitation Corp.
Turbines and Switchgear	Westinghouse Electric Corp.
Raw Water Supply Line	American Pipe & Construction Co.

Enroute to the brown stock storage, the pulp passes through Improved Machinery Inc. knotters to three Impco brown stock washers in a series and finally after screening to one Impco washer thickener. Rejects go to secondary flat screens from the Linblad Rotary screens, and the final rejects, after passing to flat tailing screens, return to the digesters for further cooking. Once the digesters had proven to have no leaks, they were insulated.

The five-stage bleach plant was installed by Impco and has a continuous process through all stages except the last. Mixers are used to agitate the pulp and chemicals because the stock is stored in high density towers at about 16 per cent consistency. Low density tanks are used to feed the bleach plant for better consistency control. The final washer is double and brings the pulp brightness to about 85 — 86 G. E. Chlorination tower equipment is supplied by Sandy Hill Iron & Brass Works, and the batch agitation equipment by James Brinkley Co. Bleached stock is held in high density storage, passed to Linblad screens and goes finally to the machine chest. The head box is of wooden construction.

The 156-in. machine is a Rice Barton Corp. fourdrinier with a Minton vacuum dryer. Ventilation is supplied by Drew Engineering of Portland.

The finishing room is one of the most modern and automatic anywhere. The product is practically "untouched by human hands." From the Lamb-Grays Harbor Co. layboy, the stacked pulp sheets are picked up from a belt conveyor by fork lift truck and deposited into the assembly line flow of the baling equipment. There is one man to check the weight, but the pulp bundle is not touched until it reaches two balers who place the wraps, adjust the weight to 400 lb. per bale, and later turn the bale for the automatic tier. After it has been pressed by one of the two 1000-ton hydraulic presses installed by Washington Iron Works, the bundle is automatically baled, and then transported to storage or a freight car.

Directing Weyerhaeuser's pulp division of five mills is Vice President Howard W. Morgan with offices in Tacoma. The Everett pulp mills are managed by R. J. LeRoux, and the new kraft mill is superintended by L. G. Willins. Weyerhaeuser feels that one of its outstanding features is the key force of hand-picked men and women, many of long employment with the Weyerhaeuser interests.

Technical Director for the Everett kraft mill is John McEwen, and the plant engineer is C. L. (Bill) Carns.

Paper and wood — a new team

J. A. HALL
Director
U. S. Forest Products Laboratory*

▶ Less than 25 per cent of the softwood veneer manufactured today is of high-grade face quality. Paper overlays permit the conversion of second-grade lumber into quality products with superior surface.

▶ The discovery and application of phenolic resins—imparting moisture-proof and strength characteristics—greatly accelerated research and development of paper overlays.

▶ Resin-impregnated paper overlays can be made to provide a high-density surface, mask structural defects, provide an excellent paint base, and show high abrasion resistance.

TWO DECADES OF RESEARCH at the U. S. Forest Products Laboratory aimed at increasing the usefulness of paper and wood by combining them are paying off in a swiftly widening array of new products of real promise.

These two products of the forest, which sometimes have competed for the same markets, can be made to work together in a surprising number of ways. Properly treated and applied paper can hide knots, splits, and other unsightly features in low-grade wood; provide an excellent surface for paint; help keep moisture out of wood and restrain its tendency to shrink and swell; provide good scuff resistance underfoot; and even bolster the strength and stiffness of wood.

Some of the products of that research are in use today. Others are still in the testing stages. Some of them may not pan out — research men don't bat 1.000 any more than baseball hitters do. But it can safely be predicted that more new paper-wood products are on the way to industrial success, from light-weight aircargo boxes to house siding and fine cabinet materials.

In some of these experimental products, ordinary untreated paper is the surfacing material for wood. Such paper surfaces, whether used as paper or modified by the addition of synthetic resins, have acquired the name of "overlays." Their possibilities first intrigued researchers at the U. S. Forest Products Laboratory in 1932, when paper was glued to southern yellow pine bevel siding as a paint base. Two kinds, a thin unsized tissue and a fairly heavy kraft wrapping paper, were applied with water-resistant animal glue, the best available in those days. Because waterproof glues were nonexistent, the paper peeled off eventually. The tests demonstrated, however, that paper could greatly improve paint performance on heavy softwoods with pronounced summerwood bands that do not hold paint well. Therefore, while existing papers and glues could not take outdoor conditions, the 1932 tests impressed the scientists and stimulated their curiosity regarding other possibilities.

As it turned out, better glues and papers were much nearer reality than the researchers had any reason to suspect. Within the next few years, in fact, the development of synthetic resins was to unlock rich research possibilities.

In the fall of 1953, a shed extension was added to an auxiliary building of the Forest Products Laboratory at Madison. It represented the latest of the Laboratory's experiments with paper-overlaid siding — this time fortified with waterproof synthetic resins to help the overlay conceal the knots, splits, and other characteristics in the No. 2 common pine bevel siding.

To understand why essentially the same experiment was being repeated

*Maintained by the U. S. Forest Service, United States Department of Agriculture, in cooperation with the University of Wisconsin at Madison, Wisconsin.

21 years later, let's look at what happened in the intervening years.

Why paper overlays?

Less than 25 per cent of the softwood veneer manufactured today is of high-grade face quality, and the percentage is declining. Production of select grades of lumber varies from 15 to less than 3 per cent, according to species — the higher percentages coming, naturally, from old-growth stands of timber.

Why paper overlays? The answer is loudly implied in these statistics. We are running short of high-quality wood, and for certain uses clear, knotless, unblemished wood is needed in relatively large sizes. Either that, or something that can effectively cover up those blemishes — and thereby upgrade the wood.

Paper overlays thus would play a dual role, permitting the use of wood now left in the forest or the scrap heap and simultaneously providing a quality product with superior surface characteristics regardless of the species of wood underneath the overlay. Overlays hence become a potentially key part of the housekeeping plans of forest managers — a role that can contribute much to good forestry by making cull trees and little-used species worth the cost of getting them out of the way so that better trees can grow to maturity. One ultimate result might well be that our stocks of better wood will become plentiful again some day.

The present situation, of course, hasn't developed overnight. The 1932 experiments were made partly in recognition of the clearly seen future need for some such surfacing material. If those tests were ahead of their time, it was only because waterproof papers and glues did not yet exist. Valuable lessons were learned — notably the fact that paper was an excellent paint base.

Ten years later research was under way with new materials that gave high promise of adequate weatherproofness. Synthetic resins were the basis of both new glues and new paper impregnants that made such weather resistance possible.

Overlay papers and resins

Research on resin treatment of paper to produce overlays was greatly accelerated with the outbreak of World War II. They were a part of research that produced high-strength paper plastics for aircraft and other war uses. Thin skins of this plastic material were bonded to plywood to give it a hard, smooth surface. An early use was as table tops for parachute manufacture. But the product did not possess the properties required of a good masking overlay. Practical considerations indicated that properties other than hardness, smoothness, and water resistance were needed. For example, an overlay used to mask defects in veneer or lumber might need to be bulky and low in resin content, while one intended to provide a painting surface might preferably be thinner and denser.

Late in 1941, therefore, paper-plastic overlay research began at the Forest Products Laboratory. Early paper-plastic overlays developed were high in strength and suitable for molding at pressures in the range of those used to make plywood. Thus they could be bonded to plywood in a one-step operation that utilized the resin in the paper as an adhesive. It also was immediately obvious by analogy with plywood that highly grained papers should be laid with the principal grain (fiber) direction at right angles to the grain of the wood in order to reduce checking and gain maximum strength and other benefits from the paper. Single and multisheet overlays were tried. Tests showed greatly improved resistance to abrasion, water vapor, chemicals, and checking.

Phenolic resin was used in dry powder form, in solution with alcohol and water, and in a water-dispersible form. To cut costs, lignin was used as an extender by adding it in powder form to the fiber in the beater, along with the phenolic resin, to produce a dark, brownish plastic overlay.

Papers made ranged in thickness from 0.002 — 0.050 in. and contained resin in amounts from 55 per cent of the weight of the untreated paper down to almost none. One promising experimental paper for masking plywood was made from spruce and was about 0.030 inch thick.

Problems investigated included the bond between the overlay and the plywood, adhesion of the overlay to metal cauls, "bleeding" of resin from the overlay to the wood, blistering in the press caused by trapped moisture, and warping and cupping of overlaid panels, proper densification of the overlay in molding, and elimination of overlay checking.

In 1944 the first tests were made on commercial high-density overlays applied to Douglas fir plywood. Cooperative tests for a manufacturer included a wide variety of papers and various methods of applying overlays to plywood in a one-step operation — producing the plywood and bonding the overlay in the same hot-press operation. Overlays tried varied as to pulp used, paper weight, paper strength, resin content, and resin type.

Masking overlays

Experience with high-density overlays had direct application to subsequent research with masking and other special overlay types. While the production of high-density overlays probably still exceeds that of other types, there is little doubt that in terms of commercial volume, masking, paint-base, abrasion-resistant, and similar overlay types will in time gain predominance. Since the end of World War II, therefore, the Laboratory's research has dealt largely with low-density and medium-density overlays, commonly lumped together as "masking" overlays.

In 1944, exploratory work was started on masking overlays made in the Laboratory. Papers made of various pulps, in various thicknesses, and containing resin in amounts from 0 to 25 per cent, were evaluated for their defect-masking ability. The work yielded useful information on the quality of different sheets for masking purposes and the sizes and types of defects that could be successfully masked.

That exploratory work led in turn to long-time exposure tests on selected overlay papers that are still underway indoors and outdoors. The plywood overlaid with these sheets contained splits, knots, knot holes, rough and loose veneer, and patches. Overlay papers used include several commercial ones; two laboratory-made papers 0.026-in. thick, made of water-cooked spruce pulps and containing 10 and 20 per cent of phenolic resin; and one softwood kraft paper 0.020-in. thick and containing 20 per cent of resin, also laboratory-made. These panels are beginning to show significant differences in permanent masking ability, although results are too meager yet to permit conclusions.

Paint-base overlays

The 1932 tests of paper's suitability as a paint base over southern pine, besides demonstrating that the papers used maintained paint better than did the wood of this species, also showed that paper can reduce checking and cupping of boards.

Beginning in 1941, resin-impregnated paper overlays were tried as a paint base in further experiments along this line. Such overlays, bonded to plywood with phenolic resin glue, in nearly all cases proved a better base for the coating than plain plywood.

Grain raising and checking were reduced or eliminated, and the overlay surface was less sensitive to variations in coating thickness than plain

Fig. 1—Assembling paper honeycomb core and fiberboard facings for experimental type of house siding at U. S. Forest Products Laboratory

Fig. 2—Hot-press bonding of resin-impregnated paper overlay to experimental siding consisting of paper honeycomb core and fiberboard facings

Fig. 3—Installing paper honeycomb-core siding with fiberboard facings and resin-treated paper overlays on outside wall of building for service tests

Fig. 4—Experimental siding consisting of No. 2 common white pine with resin-impregnated paper overlay is installed on an outside wall for service tests

plywood. The amount of resin in the paper was directly related to paint absorption, and some priming paints were incompatible with some impregnating resins.

Armed with this new knowledge about resin-impregnated paper overlays, the Laboratory's research men in 1949 once again turned to southern yellow pine bevel siding as a representative dense softwood with hard summerwood bands that cause paint maintenance difficulties. Resin-treated overlays 0.002 and 0.006 in. thick were glued to the weather side of the siding, and the samples were mounted on a paint fence. Four years later the samples with 0.006-in. overlay were still in what the research men termed "reasonably" good condition. The only trouble with the thinner overlay was that adhesives tended to bleed through it.

By the middle of 1952, these siding tests had proceeded far enough to warrant an even more rigorous examination of the weatherproofness of treated overlays. Accordingly, overlays were bonded to both sides of No. 2 common white pine that contained numerous large, pitchy knots. Knots were successfully masked and the panels, painted with two typical house paints, were exposed outdoors to let weather work its worst. More than a year later, inspection showed them to be in excellent condition.

It's still much too early to draw any fixed conclusions. But the research warrants hope that resin-treated overlays are a big step forward in the hunt for masking overlays that can help paint to defy hot summers and icy winters, wet or dry.

Overlays as strengtheners

Early in the research on paper overlays it became obvious that some types of overlay sheets on plywood acted much as another sheet of veneer. The virtues of typically cross-banded plywood — with the grain of adjacent veneers at 90 degrees — have long been recognized. Would impregnated paper overlays act much the same in restraining shrinking and swelling and in stiffening and strengthening the veneer? Experiments were set underway to find out.

In 1946, kraft paper overlays containing amounts of resin ranging from nothing to 25 per cent were bonded to each side of $\frac{1}{8}$-in. Douglas fir and black tupelo veneer, with the paper "grain," or fiber, direction at right angles to the grain of the veneer. The overlays restrained cross-grain swelling of the veneer by 65 per cent, and 15 per cent resin content was found to be about right for economical service.

Subsequent tests showed that, when the veneer was used as a surfacing for doors, sandwich panels, or similar bases to which it was firmly attached, only an outside overlay was needed. Similarly successful was an overlay on the exposed face of a 2-ply plywood facing on sandwich panels with paper honeycomb cores. Since 1947 such panels have been under test in an experimental building at the Forest Products Laboratory — and standing up well.

Since 1949, tests of overlaid veneer for boxes have demonstrated that here is a material of very light weight that can give an excellent container. Comparative tests with nailed wood boxes have given it a superior rating for resistance to abuse and rough handling, as well as for ability to take compressive loads.

In 1953 a sandwich type of house siding, with overlaid veneer facings on a honeycomb core of treated paper, went under test on the same auxiliary building with the overlaid No. 2 common white pine.

The idea of this siding is that the tube-like cells in the honeycomb core will help ventilate the wall, permitting entrapped moisture to escape and thereby avoiding some types of blistered paint and numerous other adverse moisture effects.

What resin-treatment does

Synthetic resins of the phenolic type soon after their discovery became established as adhesives of hitherto unattained waterproofness. That trait, long sought for woodworking glues, rapidly gained them a place in the wood industries. In the late thirties, the dimensional stabilizing effect of resins introduced into the fine cell-wall structure of wood was shown by the Laboratory with such products as impreg and compreg, the shrinking of which is much less than that of untreated wood.

It was logical, therefore, to try phenolic resins as a stabilizer for paper also — especially to improve its notably low water resistance. As the highly beneficial effects of these resins became apparent through research, water and vapor resistance were carefully assessed. With overlaid products, for instance, it was found that the wood, the glue lines, and the resin-treated overlay paper all helped block passage of moisture through the construction.

Preliminary experiments in 1945 on high-resin-content papers molded to veneer gave low vapor transmission rates. Work was pushed thereafter on control of the rate during treatment. Factors such as molding time, pressure, and temperature were found to have an effect.

Significantly, when thick low-resin-content masking papers with little moisture resistance were glued to veneer or plywood, the composite had surprisingly high resistance. For various uses, however, the most effective vapor transmission rates have not yet been ascertained.

Wear resistance of overlays

A quality of overlays that has had some application in buses and aircraft, and may become much more important, is their ability to resist wear, as on floors. Abrasion tests at the Forest Products Laboratory showed that wear resistance increases considerably as the resin content of the overlay is increased. The kind of paper used, however, also has an effect. One of the best tested was a hardwood semi-chemical paper; other good ones were made of kraft pulps. Soda and groundwood pulps, however, gave papers poor in scuff resistance. Resin was particularly beneficial under wet conditions.

Tests made in 1945 showed that high-density paper plastic overlays gave a good floor surface for cargo aircraft. Overlays were bonded to both sides of solid basswood cores and 7-ply crossbanded yellow poplar cores, and the wearing surface was roughed to reduce slipping. The roughed overlays provided very good wearing surfaces for special floors.

Quality tests of overlays

From the Laboratory's overlay research, quick test methods that evaluate quality have been established for high-density plastic overlays. These cover water resistance, water vapor transmission, resistance to checking, and abrasion resistance, and form the basis of U. S. Air Force Specification No. 15015, Plywood: Plastic Faced, first issued in 1948.

Similar tests and standards for low-density masking overlays are being worked on. Inspection conditions and tests for shear strength and delamination are being related to service performance to get good correlation.

Only in recent years have the use requirements for the various types of overlays developed to date begun to become clear. Today overlays are no longer laboratory curiosities, but are well enough understood so that they are coming into commercial use for many purposes. Now that industrial researchers have a clearer picture of the many potential uses of and requirements for their product, they can apply their skill and knowledge to develop specialized products engineered to do specialized jobs.

Problems affecting the wider use of wood as a technical raw material*

HARRY F. LEWIS
Research Associate
The Institute of Paper Chemistry
Appleton, Wis.

Part II—The wood pulping industry

▶ **Should efforts be concentrated on the production of high-yield pulps—thus retaining much of the lignin fraction—or on the recovery of chemicals from the non-cellulose wood constituents?**

▶ **Questions of economics, markets, local conditions, and raw material supplies will more or less dictate the course for each company.**

▶ **If the trend is toward high-yield pulps, how can we improve the bonding qualities of lignin?**

A SOMEWHAT DIFFERENT approach to the technical utilization of wood is that of pulping, although this too can be looked upon as a chemical utilization of wood, as discussed in the January issue of THE PAPER INDUSTRY. In pulping we are primarily interested in separating certain of the biological constituents lumped together roughly by the pulp manufacturer as fibers, although the fiber microscopist can identify, in addition to true fibers, vessels, tracheids, and ray cells and at times even pieces of bark and common mill dirt. Bleached chemical fibers consist mainly of cellulose and hemicelluloses. Unbleached chemical, semichemical, and groundwood fibers will contain in addition substantial and varying amounts of lignin, with the latter located either around and to a less degree throughout the wall of the fiber or only in the wall. The degree of polymerization of the cellulose will vary in heterogeneity and in dimension by virtue of the particular processes employed in making the particular product. The fine structure of the fiber will depend somewhat on the species of wood and to a smaller degree on the treatment.

The bleaching stage may either remove lignin and its chlorinated derivatives together with the colored by-products of carbohydrate reaction, or it may remove only the carbohydrate by-products, depending on the nature of the bleaching agent. In some conditions it may, if carefully handled, produce a whitening effect sometimes alluded to, possibly wrongly, as a surface phenomenon.

In general, what we do in pulping is to treat wood in such a manner as to make it possible to separate the fibers "with a minimum of breaking." In conventional chemical pulping to an easy-bleaching pulp we actually dissolve a large part of the lignin in the middle lamella which separates and yet holds together the fibers in a regular structure. Since wood is roughly a 25 per cent lignin, we would expect to recover only 75 per cent of delignified wood substance. Unfortunately, delignification by the conventional reagents is not the only reaction. Hemicelluloses are also dissolved—partly as is, partly after hydrolysis. A certain amount of the lower molecular form of cellulose is also dissolved but mainly after hydrolysis. This occurs under the influence of high temperatures and pressures of pulping together with cooking chemical. Thus we may end up with only 40 to 50 per cent yields of pulp (and not all cellulose) from a wood which contained up to 60 per cent of cellulose.

Emphasis on high-yield pulps?

One way of getting a better technical utilization of wood in a pulp mill is therefore to maintain it under conditions such as will permit the separation of the fibers before the lignin, the hemicelluloses, and the cellulose constituents begin to dissolve. Processes which approach the ideal condition we call high-yield or semichemical pulping processes; a related process is that of chemigroundwood. They are constantly becoming more important wherever pulp is made in any quantity. They call for less chemical and result in a lower rate of solution of wood constituents. This latter means, qualitatively at least, that less goes into solution, although the hemicellulose and degraded hemicellulose-rich liquor constituents may cause embarrassment in the stream at distances much closer to the mill than is the case with ordinary spent sulfite liquor.

The extent to which we can go in high-yield pulping would seem to depend upon the paper being made. Since the bonding of fiber to fiber and fibrile to fibrile depends upon the hydrogen bonding potential of the fiber — which is high where cellulose and hemicellulose surfaces are concerned—it follows that high bonding strength (extensive hydrogen bonding) calls for the greater removal of the lignin from the fiber surfaces either by cooking or bleaching. In papers where ultimate bonding strength is less important than stiffness, high-yield pulps are desirable.

Related to the hydrogen bonding as an element in the strength of paper is the number of points of contact there are between fibers per unit of weight. Thick rod-like fibers result in less points of contact per gram than narrow fine fibers, since the former will weigh more and be less flexible than the latter. An illustration is given by a comparison of kraft pulps made from western red cedar and loblolly pine. The cedar kraft pulp contains 4,500,000 fibers per gram, the loblolly pine only 3,800,000. A high-yield pulp of a given species will produce from the particu-

*Based on a paper presented at the Thirteenth International Congress of Pure and Applied Chemistry, Stockholm, Sweden.

lar wood the same number of fibers as the low-yield pulp, but each fiber will contain more lignin and more hemicellulose. The specific density (or weight factor) of the high-yield pulps will be greater therefore than for conventional pulps. Sheets of equal weight made from high-yield and conventional pulps will contain less fibers of the former and less fiber-to-fiber contacts than would be the case with the latter. They will therefore be weaker in those qualities such as burst, depending upon the area of bonding. Since these fiber surfaces will have much more lignin than is the case with conventional pulps, not only will the bonded area be less but also the lower strength of the fiber-to-fiber bonding will affect the bursting strength even more. This is counteracted to some extent by the easy bonding hemicelluloses, which are also left in high-yield pulp.

One problem, then, for getting better technical utilization of wood in pulping is to improve the bonding qualities of lignin from aqueous suspension, as by adding substances to the furnish which bind lignified fibers. A somewhat absurd suggestion for doing something of this kind would be to replace water in the papermaking process by some organic solvent which would swell and partially dissolve the lignin. A method for achieving the same end would be to substitute for the liquid-solid system in papermaking a gas-solid system of air and fibers to which heat-reactive bonding agents might be added. This idea has been tossed around for some time without too many takers as of now. I might add that if we were to use this extensively, we in the states would no longer be in the paper business, since the "Dictionary of Paper," which is the paper bible, says that, "Paper is a felted sheet of fibers formed on a wire screen from a water suspension." The fibers may be vegetable, mineral, animal or synthetic. Thus the particular situation develops that an air-formed sheet made by felting wood fibers would not be paper, but a water-formed sheet made by felting glass or asbestos fibers would be paper.

Or on chemicals from lignin?

Instead of leaving the major noncellulose solid constituents of wood in and on the fiber, still another way to achieve better technical utilization of pulpwood is to devise adequate means for converting the solubilized portion of the wood into useful and valuable materials. Marathon Corp.'s Chemical Division has been a leader in developing new processes and products from spent sulfite liquor. At the Rothschild, Wis. chemical plant the company is in current production with a variety of products. At this plant the spent liquor is precipitated with lime according to the Howard process with the subsequent production of lignin sulfonate and calcium sulfite. The lignin sulfonate thus obtained is removed and converted to vanillin in part and in part to a variety of specific lignin derivatives, such as dispersing agents, tanning agents, and oil well drilling mud additives. The vanillin produced from this lignin represents a substantial portion of the vanillin made and sold in the United States. Three sulfite mills in Wisconsin are now evaporating their spent liquor in Rosenblad evaporators and either selling the concentrated products or converting them to steam in special boilers. One of the three is manufacturing approximately six tons of torula yeast per day from the sulfite liquor carbohydrates. The effluent from this process, which is essentially a sugar-free lignin, can be evaporated either in part or to dryness for sale. The system is flexible in that it may take advantage of the yeast and chemical markets to shift its production accordingly. We have on the West Coast one company making alcohol from spent liquor, selling the residual lignin either dry or as a concentrated solution for incorporation in cement mixes or in the manufacture of vanillin. We have a number of companies evaporating spent liquor to a 50 per cent concentrate or to a dry form for sale. One has converted its spent liquor carbohydrates to lactic acid, selling the mixture of lignin sulfonate and crude lactic acid as a tanning agent and for other purposes. At least one company is evaporating ammonia-base liquor for the soil conditioning market, and one is operating a magnesium-base process in a fully successful operation. A second plant is going up in Alaska using the magnesium-base process. In this, as you know, the organic chemicals dissolved from wood are evaporated and burned and help in the recovery of the inorganic chemicals and at the same time produce steam.

Almost without exception the alkaline pulping mills evaporate and burn their dissolved organics with the production of heat and subsequent recovery of their cooking chemicals. There is probably a fine balance which makes it unprofitable to remove too many of the dissolved organics at the expense of the easy combustion of the liquor. In spite of this, however, there are at least two companies using alkaline pulping processes which recover a part of the lignin for sale. One is a soda hardwood operation, the other a kraft pine operation.

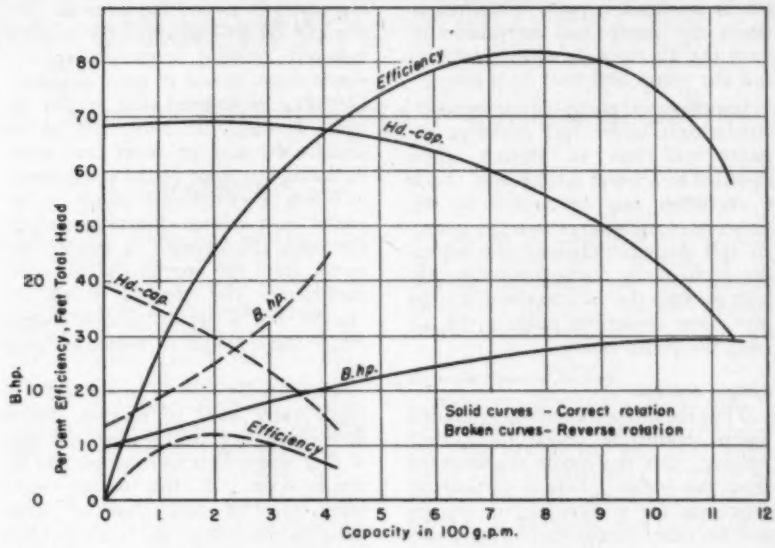
I have tried to illustrate the two ways of getting high return from the utilization of wood in pulping. This illustrates the old adage that "You can't eat your cake and have it too." We can't have a high-yield pulping process and an extensive chemical lignin business at the same time. The successful solution of the problem of developing high bursting strength from high-yield, high-bleach pulps, together with other desirable paper properties, would see the industry universally trending in that direction. If this would be the case the dissolved liquors would be easily fermentable carbohydrates containing relatively little lignin. On the other hand, it is conceivable that pulping by improved processes for delignification without too much cellulose degradation might bring a better return provided further basic and applied research develops a broader lignin industry than we now have. A real lignin industry would have to be developed in about the same way as the coal tar industry, except for the fact that we would have a lot less material to convert than do the coal tar people. It seems to me that we will find ourselves going down both roads, with economics, markets, local conditions, and raw material supplies more or less dictating the course for particular companies to take. Even then we are faced with what the dreamer might do for us if he really got going on an air-formed, resin-bonded, stabilized lignin sheet.

Chemical cellulose

Any consideration of pulping is incomplete without reference to the increasing importance of cellulose from wood as the base for the fast-growing cellulose derivative industry. This involves of course the production of chemical cellulose for conversion into cellulose xanthate and nitrocellulose, cellulose acetate and ethyl cellulose, and the various other esters and ethers, followed by the conversion of these into end products—filaments and films, chemical additives, molded articles, and the like. Chemical cellulose is becoming more and more an important product of the wood pulp industry of the world. Since chemical cellulose must be freed from the noncellulosic constituents of wood, the latter become raw materials for a by-product operation. Their usefulness is shown by the fact that the liquors from a rayon pulp give the best yield of brewer's yeast.

Centrifugal Pumps

IGOR J. KARASSIK and ROY CARTER
Application Engineers, Worthington Corp.



Part 30 of a series

Pump troubles—hydraulic

THE TROUBLES that may affect the operation of a centrifugal pump may be either of a hydraulic or of a mechanical nature. In the first group, a pump may fail to deliver water, it may deliver an insufficient capacity or develop insufficient pressure, it may lose its prime after starting or consume excessive power. Symptoms of mechanical difficulties may show up at the stuffing boxes, at the bearings, or in the vibration, noise or overheating of the pump.

At the same time, it is important to note that there exists a definite interdependence between some difficulties of both classifications. For instance, increased wear at the running clearances must be classified as a mechanical trouble, but will result in a reduction of the net pump capacity — a hydraulic symptom — without necessarily causing a mechanical breakdown or even, let us say, excessive vibration. As a result, it may be of great advantage to classify symptoms and causes separately and to list for each symptom a schedule of potential contributory causes. Such a tabulation is presented in the check chart on page 1216.

In practically all cases, the cure for each cause of trouble is self-evident, and the remainder of this chapter will be devoted to the analysis of some of the most important trouble spots, an analysis which may be further helpful in diagnosing and, in some cases, preventing these troubles.

Material from this article will be included in a book on centrifugal pumps now being prepared by the authors; hence, all rights to republication are reserved by the authors.

Pump noises

If a centrifugal pump produces a crackling noise, it is generally found that the cause is on the suction side. Most centrifugal pumps operating in the break because of excessive suction lift produce such a crackling noise. This, however, is not true of hotwell pumps, which are frequently designed so that they will normally operate in the break and thus be automatically controlled as to capacity. When the noise produced by a centrifugal pump can be classified as a rumble, the cause is generally found to be in the discharge water ways. A rumbling noise may be produced by a pump when it is operated at part capacity or at a capacity in excess of its normal range of application.

Water hammer is caused by a sudden change in the velocity of flow of a column of liquid and usually is only of a serious nature when long pipe lines are involved. It can be avoided by starting a pump against a closed gate valve and by opening the valve slowly after the pump is started, thus causing a very gradual increase in the velocity in the pipe line. During the stopping cycle, it is necessary to shut the gate valve slowly and stop the pump after the valve has been fully closed. This method fails when a unit or units may be stopped suddenly by a control or power failure, so that additional provisions to control water hammer must be provided in installations where the resulting pressure due to water hammer can reach a dangerous magnitude.

In such installations, slow opening and closing check valves are generally employed so that, in starting, the flow is gradually increased and in stopping a reverse flow results and is gradually stopped. In other cases, a special protective valve is employed.

This valve is a type which opens wide quickly with the drop of pressure which is part of a water hammer cycle and then closes slowly to throttle the resulting back flow. In some cases, air-charged surge tanks or air chambers have been used satisfactorily. As the time required for a motor-driven pump to stop delivering water after the power is cut off is almost instantaneous, water hammer can be a more serious problem with that type of installation than it would be if the pump stopped slowly. In a few very important high head installations, the stopping time has been lengthened to ease the situation by adding a flywheel to the unit. While the actual time before the unit stopped pumping is lengthened very little, this slower stopping cycle helps greatly in minimizing the water hammer.

Air leakage into the pump

If a limited amount of air is allowed to leak into the suction side of a centrifugal pump, the air will be carried through the pump. This ability of a centrifugal pump to carry a small amount of air through its passages is utilized in some installations involving a pneumatic tank to add air to the tank. Naturally, if air leaks into the suction passages and passes through the pump, there is a reduction in the amount of water handled and power required. If the amount of air allowed to leak into the suction

side is increased, a point is reached at which the pump will be unable to carry the air through with the water, and the pump will lose its prime.

Sometimes a pump which operates satisfactorily under full discharge capacity will lose its suction when throttled to a lower rate of flow. Such a condition may be caused by the presence of air leakage into the pump. At full discharge capacity, the velocities in the pump casing are sufficiently high to wash the air into the discharge pipe, thus constantly purging the air from the pump casing.

System troubles

The motor of a newly installed pump should be tested for correct rotation with the motor disconnected from the pump. This is particularly important for vertical turbine pumps and for other pumps employing shafting sections joined by screwed couplings. With this type of shafting, incorrect rotation, even for testing, would result in one or more couplings becoming unscrewed and would require drawing the pump out to reconnect the joint or might even result in damage to some of the pump parts.

When a centrifugal pump is operated in a reverse direction, its performance characteristic is wholly different from the normal and is highly inefficient. The effect of reverse operation for a typical double-suction single stage design is charted on page 1215.

Occasionally, the non-return or check valve used to prevent reverse flow through a pump when the unit is shut down fails to function and remains open. If this occurs, there takes place a back flow of water through the pump, the latter becomes a water turbine, and, if the driver does not act as a brake, the unit rotates in the reverse direction at the runaway speed of the pump acting as a water turbine. This runaway speed depends on two factors: the type of the pump and the net head available. With an effective net head equal to the design pumping head, the runaway speed varies from a maximum of approximately 175 per cent of rated speed with low-head high specific speed types of propeller pumps to even less than rated speed for high-head low specific speed types.

Most pumping systems involve both a static and frictional component. Thus when reverse flow occurs, the net head, which is now the static head less a friction head, is usually considerably less than the normal pumping head, which was static plus friction. This lower net head available at the time of reverse flow causes the resulting runaway speed to have a lower value than would result with a net head under reverse flow equal to the design head.

Too low or too high an operating speed can generally be the cause of faulty operation only in the case of a turbine or engine driven unit, and while the process of correcting this trouble may be in some cases more involved than the correction of wrong direction of rotation for a motor, it is not too difficult of execution. It remains necessary to remember, however, that if the pump driver is subject to speed variation, the first step in diagnosing variation of operating conditions is to determine the operating speed and check whether it corresponds to the design.

The problem of parallel operation of centrifugal pumps has been discussed in an earlier article. If it is attempted to operate centrifugal pumps which, by virtue of their characteristics, are unsuitable for parallel operation, the choice of corrective measures is not too attractive. In some conditions, it may be found that as long as parallel operation is restricted to the higher capacity range of the various pumps no difficulties arise. It becomes necessary in such cases to maintain only such a number of pumps on the line which will insure their individual operation in this higher range of capacities. If high-head pumps are involved and, especially, if these pumps handle liquid at or near its boiling point, it is absolutely essential to maintain the protective recirculation by-pass lines open at all times in order that an unforeseen reduction in total capacity does not result in the slamming of a check valve on one of the pumps with the consequent burning up of the unit.

CHECK CHART FOR CENTRIFUGAL PUMP TROUBLES

TEN SYMPTOMS	POSSIBLE CAUSE OF TROUBLE (Each number is defined in the table below)
Pump does not deliver water:	1—2—3—4—6—11—14—16—17—22—23
Insufficient capacity delivered:	2—3—4—5—6—7—8—9—10—11—14—17—20—22 23—29—30—31
Insufficient pressure developed:	5—14—16—17—20—22—29—30—31
Pump loses prime after starting:	2—3—5—6—7—8—11—12—13
Pump requires excessive power:	15—16—17—18—19—20—23—24—26—27—29—33 34—37
Stuffing box leaks excessively:	13—24—26—32—33—34—35—36—38—39—40
Packing has short life:	12—13—24—26—28—32—33—34—35—36—37—38—39—40
Pump vibrates or is noisy:	2—3—4—9—10—11—21—23—24—25—26—27—28 30—35—36—41—42—43—44—45—46—47
Bearings have short life:	24—26—27—28—35—36—41—42—43—44—45—46—47
Pump overheats and seizes:	1—4—21—22—24—27—28—35—36—41

FORTY-SEVEN POSSIBLE CAUSES OF TROUBLE

Suction Troubles

1. Pump not primed
2. Pump or suction pipe not completely filled with liquid
3. Suction lift too high
4. Insufficient margin between suction pressure and vapor pressure
5. Excessive amount of air or gas in liquid
6. Air pocket in suction line
7. Air leaks into suction line
8. Air leaks into pump through stuffing boxes
9. Foot valve too small
10. Foot valve partially clogged
11. Inlet of suction pipe insufficiently submerged
12. Water-seal pipe plugged
13. Seal cage improperly located in stuffing box, preventing sealing fluid entering space to form the seal

System Troubles

14. Speed too low
15. Speed too high
16. Wrong direction of rotation
17. Total head of system higher than design head of pump
18. Total head of system lower than pump design head
19. Specific gravity of liquid different from design
20. Viscosity of liquid differs from that for which designed
21. Operation at very low capacity
22. Parallel operation of pumps unsuitable for such operation

Mechanical Troubles

23. Foreign matter in impeller
24. Misalignment
25. Foundations not rigid
26. Shaft bent
27. Rotating part rubbing on stationary part
28. Bearings worn
29. Wearing rings worn
30. Impeller damaged
31. Casing gasket defective permitting internal leakage
32. Shaft or shaft sleeves worn or scored at the packing
33. Packing improperly installed
34. Incorrect type of packing for operating conditions
35. Shaft running off center because of worn bearings or misalignment
36. Rotor out of balance resulting in vibration
37. Gland too tight resulting in no flow of liquid to lubricate packing
38. Failure to provide cooling liquid to water-cooled stuffing boxes
39. Excessive clearance at bottom of stuffing box between shaft and casing, causing packing to be forced into pump interior
40. Dirt or grit in sealing liquid, leading to scoring of shaft or shaft sleeve
41. Excessive thrust caused by a mechanical failure inside the pump or by the failure of the hydraulic balancing device, if any
42. Excessive grease or oil in antifriction-bearing housing or lack of cooling, causing excessive bearing temperature
43. Lack of lubrication
44. Improper installation of antifriction bearings (damage during assembly, incorrect assembly of stacked bearings, use of unmatched bearings as a pair, etc.)
45. Dirt getting into bearings
46. Rusting of bearings due to water getting into housing
47. Excessive cooling of watercooled bearing resulting in condensation in the bearing housing of moisture from the atmosphere

Are older workers efficient?

A revolutionary change in our social pattern

W. SCHWEISHEIMER

HOW MANY INDUSTRIAL WORKERS are now at "retirement age" or nearing it? That is an important question for management, since today industry has to bargain old-age security. It is an important question for the older industrial worker as well. Most of them want to work unless they are forced by illness or compulsory retirement to stop working.

Up to now very few people have been aware of the truly revolutionary implications of the rapidly changing trends in our population, as has been pointed out recently by Dr. M. Gumpert. A hundred years ago, one out of 38 Americans was over 65. At the beginning of the century, the proportion was up to one out of 25. Today the figure is one out of 13. The number of persons 65 years old or over has risen from 3,000,000 in 1900 to 11,500,000 in 1950 in the United States. By 1980 we may expect to have about 20,000,000 persons over the age of 65.

Industry in all its branches today has more older men proportionally than ever before. Extensive research has shown that those older men have the same industrial productivity than younger men. They may have some physical handicaps: less muscular strength, some defects in seeing or hearing, sometimes clinging to older methods. On the positive side are the older worker's skill and experience, his patience, sobriety, loyalty, less absenteeism, fewer accidents, and better morale.

There is evidence, according to Ewan Clague, Commissioner of Labor Statistics, U. S. Department of Labor, that experience on a given job often tends to maintain the particular kind of vision that the job demands even after other functions of seeing become impaired. Many an oldster has keener hearing and better vision than the average man 20 or so years his junior. This emphasizes the great importance of appraising the older worker as an individual.

Lowest rate of absenteeism

The observations of the Bureau of Labor Statistics have shown that the lowest rates of absenteeism occurred in the 55-59 age group. Men over 65 had a slightly higher rate, but even so they lost much less working time than men in their twenties.

With respect to work injuries, the record of the older workers was excellent as well. Disabling injuries occurred slightly less frequently among workers over 50 than among those under 50. Non-disabling injuries (those which usually required only first aid) were much less common at the age of 50 and over than in the younger age groups. Some of these older workers might have been shifted into less hazardous jobs. Once they have been injured though, older workers take longer to recover.

Dr. N. W. Shoek came to the conclusion: the diminished accident rate for older workers more than counterbalances the longer healing period so that, in general, older men have proved less expensive from the standpoint of accident cost than younger men.

What individual firms do for their older workers

A recent story in the *Wall Street Journal,* quoted by Mr. Clague, gives a number of examples of what individual firms have done to utilize their older people more effectively. Many companies follow the practice of shifting aging employees to lighter work. Boilermakers become inspectors, carpenters are shifted to packaging, and laborers become elevator operators. In this way there can be a helpful adjustment between job and workers, setting the stage for full retirement when it comes.

Many labor-management agreements operate to protect the aging worker on the job. Seniority rules, by linking job security with length of service, offer a substantial measure of protection to older employees in many industries. Some agreements even go further in trying to promote the employment of the older workers. Mr. Clague mentions in this connection that in the building trades a union contract may specifically require the employment of one man aged 55 or over for each 5, 7 or 10 journeymen on the job.

The seniority system, which increases the older worker's job security as long as he is employed, works to his disadvantage when he is on the outside. As Mr. Clague points out, the desires of employers to take care of their own aging workers by reserving lighter jobs for them tend to freeze out the older person who no longer has an employer.

Age distribution survey

Recently, Associated Industries of Minneapolis ran a survey to find the age distribution of the local labor force. It checked 531 firms with nearly 84,000 employees, slightly more than one-third of the city's non-agricultural labor force.

The survey found that of non-management employees 7.3 per cent were 60 or over; 3.1 per cent were 65 or over; 22.2 per cent were from 45 to 60, and 22.3 per cent were under 25.

Associated Industries says that 155 of the 531 industrial companies checked have pension plans. Of 154 pension plans outlined, 73 require retirement (mostly, at age 65) while 81 leave it up to the worker — provided he is physically fit.

And the latter surely is how it should be. For many older workers work is life itself. Dr. A. J. Lanza, Director of the Institute of Industrial Medicine of the New York University Medical Center, called the problem of old age one of the most significant in industry. He welcomes a marked inclination to liberalize compulsory retirement where the worker is in good physical and mental condition. This is particularly true among "specialists."

Prof. Howard A. Rusk, of New York University College of Medicine, made the suggestion to create an impartial panel consisting of physicians, psychologists and representatives of management and labor who periodically would evaluate older workers from the standpoint of health, productivity, emotional attitudes and personal factors when the worker did not wish to retire voluntarily. In accordance with the findings of such a panel, the older worker could remain in his present position, be placed in a less arduous task, be placed on part pension with shorter hours and a corresponding decrease in pay, or be retired. This plan would substitute an individual approach rather than the standardized, arbitrary measures now frequently used.

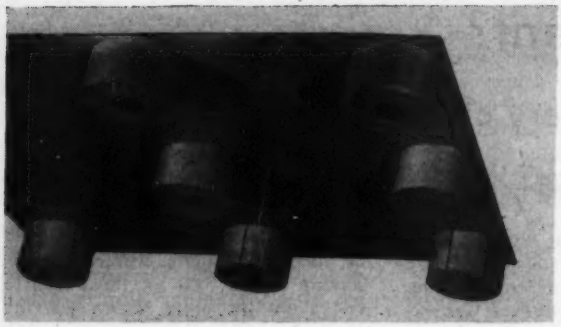


Fig. 1—Recently developed "expendable" pallet of corrugated paper; strapped loads of up to 3000 lb. may be handled safely

Fig. 2—Microphone, speaker and controls mounted on the steering column of an industrial truck

Motorized industrial truck applications

WILBUR G. HUDSON
Consulting Engineer

THE MOTORIZED INDUSTRIAL TRUCK is making quite a place for itself in the materials handling field. Sometimes it must share the job with a mechanical conveyor; on the other hand, sometimes it does a job that stumps a conveyor, as when packaged loads are to be distributed and tiered to secure maximum storage capacity, where heavy unit loads are to be picked up, moved and stacked, and where packaged loads are to be loaded to or unloaded from box cars.

With the development of the high-lift truck, industry was offered a device of wide versatility. It is just as efficient in transporting skid or pallet loads as it is in tiering them. Because of vastly increased plant construction costs, utilization of normally wasted space has become an important consideration. The early 6000-lb. capacity trucks were most popular. With the swing toward faster movements and better maneuverability, load ratings have dropped to where the 2000-lb. or even 1000-lb. units are in greatest demand.

There have been developments in pallets and skids. These now are available in aluminum, steel rolled sections, expanded metal, and paper. The latter, introduced in 1950, is of corrugated paper and costs about one-third as much as a wood pallet and so may be considered expendable. The design facilitates the strapping on and safe handling of loads up to 3000 lb. (Fig. 1).

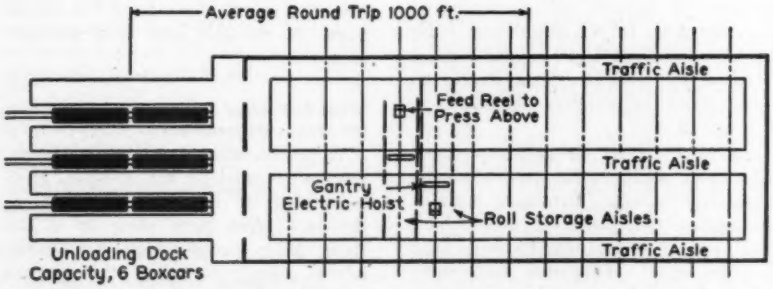


Fig. 3—Typical job for the motorized industrial truck: unloading from cars five hundred 3000-lb. paper rolls every 24 hours and distributing and stacking them along each side of the storage area; certain rolls are destined for certain presses on the floor above

Two-way radio equipment improves efficiency

One handicap to efficient operations of truck groups in large plants has been eliminated by the perfection of mobile two-way radio equipment (Fig. 2). Each truck is in direct contact with the central dispatching office. The office assigns specific jobs to each operator and knows where the driver is during each step of the assignment. While the installation cost is high (a dispatcher station and fleets of five, 10, and 20 trucks so equipped cost $3000, $5,500 and $10,500 repectively), it is not unusual for the savings to pay for the investment in one year.

These radios are on the Low Power Radio Service band recently established by the FCC for industrial operations. The dispatcher's radio is operated from the 100-volt ac house circuit. The mobile units are powered by the truck batteries.

Case history

One of the most interesting problems in the writer's experience was at a plant publishing a weekly magazine. At the receiving end, three shifts of eight cars are placed daily, calling for an unloading rate of one car per hour (Fig. 3). Each car contains twenty-one 3000-lb. paper rolls mounted on 6-in. pipe cores. These rolls are destined for certain storage racks crosswise along a long storage room. From the racks the rolls are fed as needed to reels serving the presses on the floor above. The rolls are stacked crosswise, two deep, in the cars. A motorized boom truck with yoke grab attends to the unloading. Two men in the car attend to inserting the yoke stubs into the core pipes, then the boom truck backs out, and the self-releasing yoke deposits the roll on the platform alongside. Two trucks oper-

Fig. 4(A)—Roll taken from trailer about to be up-ended for storing; (Fig. 4 courtesy Clark Equipment Co.)

Fig. 4(B)—High-lift fork truck stacking rolls in pairs; truck at right is bringing in roll and about to up-end it

ate simultaneously on adjacent platforms to maintain the required rate of a car per hour. To assure uninterrupted operation a spare truck and replacement batteries are provided.

Next comes the movement of the rolls along the central aisle of the storage room. A floor-level platform conveyor cannot possibly function here because certain rolls are destined for certain racks and, should a roll pass along too far, the conveyor cannot be reversed because of the following rolls. Fork trucks are used also for moving the printed sheets from the presses to the binders and (on the floor below) to the various points of bagging, weighing, and shipping by truck or cars. As the output is about 4,000,000 magazines each week on a rigidly maintained schedule day by day, motorized trucks were adopted as best suited to these requirements.

Fig. 4 illustrates the advantage of the truck when operating in limited storage areas. In "A," a roll of newsprint has been lifted from a trailer and is being rotated to a horizontal position. In "B," the rolls are being stacked three high in pairs by a high-lift truck. The truck at the right has been brought in and is about to be up-ended for stacking.

What type to use?

Industrial trucks are of three general types as regards power:

1. Battery electric, which is powered by a storage battery and employs electric control and transmission.
2. Gas electric, which is powered by an engine and generator which drives the motor.
3. Gas mechanical which is powered by an engine and employs mechanical control and transmission, as in an automobile.

The greater economy of the battery electric truck is due mainly to the low cost of electric power and the absence of loss during idle periods. Sometimes, however, a costly charging station must be taken into consideration. The gas electric field and the gas mechanical field are for use where electric power is not available or where the trucks are moved from point to point and cannot be kept near a charging station. There is some disadvantage because of the carbon monoxide, etc., in the engine exhaust where operations are indoors, and certain ventilation standards must be observed in the areas where they are operated. In normal operations the oxidation of the hydrocarbons is incomplete, and there is a diffusion of heavy aromatics, tars, and partially oxidized carbonaceous material, a fact that has to some degree restricted the use of such equipment. Neutralizing the effects by catalytic apparatus (a catalyst is a reacting agent), is difficult because the exhaust varies over a wide range of quantity, chemical composition, and temperature.

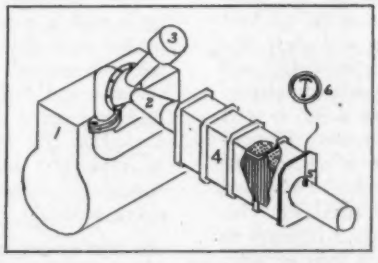


Fig. 5—Catalytic apparatus as substituted for the usual muffler to convert carbon monoxide in the exhaust into harmless carbon dioxide

Catalytic apparatus eliminates carbon monoxide

Of interest in this connection is a catalytic apparatus developed in 1950 which the manufacturers claim eliminates 99.5 per cent of the carbon monoxide and aldehyde in exhaust fumes and renders them harmless. It is applicable to trucks having an engine displacement of 190 to 240 cu. in. and only with gasolines not containing lead. Fig. 5 shows the assembly: (1) is the engine fitted with an exhaust manifold having a venturi inlet (2), which introduces fresh air into the exhaust-gas stream to provide the necessary oxygen for the conversion of the CO and other obnoxious fumes. The air filter (3) cleans this added fresh air. The conversion element (4) is substituted for the standard muffler and has a suitable number of standard sections, each containing one catalytic assembly. The catalytic units consist of multiple (45 to 75) "sticks" of porcelain coated with a thin film of platinum as the catalyst. The thermal couple (5) indicates the temperature of the exhaust gases after exposure to the catalyst and registers on a pyrometer (6) to indicate whether a safe range is being maintained.

It is to be noted that this device must be exactly adapted to the particular type of engine and the operating cycle, and that unleaded gasoline is not always available. Carbon monoxide is not absorbed by the introduction of the catalytic units but is transformed into harmless CO_2 if clean air is introduced into the exhaust stream.

The Underwriters Laboratories Inc. on October 9, 1951, after a series of tests, approved the device as performing with reasonable effectiveness in reducing exhaust hazards when properly installed, operated, and serviced.

Maintenance procedures in a paper mill*

IRVING M. WITHAM
Chief Electrician
Byron Weston Co.

WHEN IT COMES TO EFFECTIVE maintenance, the ideal is to have some simple foolproof system that will work under all conditions. Of course this cannot be realized 100 per cent, but a fair working approximation can be made which is of great practical value. At the Byron Weston Co. plant in Dalton, Mass., where high-grade papers for business records are made, we depend largely on two things. One of these includes the more or less formalized procedures which have been set up, and the other is a quality comparable to "woman's intuition" which we endeavor to create in our maintenance personnel, and which has met with considerable success.

This intuition or instinctive perception is present in varying degrees in different people. A good maintenance man must be selected carefully with this in mind. If he is not alert, or slow to sense impending danger, his value to the company can never be assured. One of the quickest and easiest ways of developing a willing and alert employee is to awaken in him a sense of responsibility and pride in his work. This, along with a little self-confidence, is usually the result of honest praise when a job is well done. Real encouragement to do better is never brought about under strained relations when there is no hope of appreciation. At our mill we have a 15-minute rest and smoking period in the morning and in the afternoon. Instead of allowing the men to brood over their troubles by themselves or to get into an argument with men of other departments, we get together and discuss interesting and instructive problems in our own department. New work or events that affect the department are discussed in advance so that all are familiar with what will be expected of them.

Prime requisite is to know equipment

It cannot be stressed too strongly that the prime requisite of a good maintenance worker is to know when the equipment is operating normally and satisfactorily. In the case of a new man this knowledge is acquired through long hours of honest study and work. Motor cards such as furnished by Westinghouse or General Electric are invaluable for recording information about the individual pieces of equipment. They must, of course, be kept up-to-date with as much information as can possibly be obtained about the control, drive, motor, and history of past performance.

Equally important is to provide the means of discovering as promptly as possible when the equipment is not operating properly. This is accomplished, in our mill during the Monday morning inspection, when the men are fresh and supposedly at their best. It is a hard and fast rule that nothing can interfere with the Monday morning inspection and oil-up. As conditions vary in different parts of the mill, the inspection is charted along several routes, with a man and his helper assigned for each route. The same team always covers the same route so as to become thoroughly familiar with it and the idiosyncrasies of all the equipment.

Some 25-year-old installations require constant inspection for signs of breakdown

All motors are numbered to correspond with the motor cards with a quick label pipe marker. The men jot down on the form the motor number and any conditions that do not look normal. Excessive heat, dirt, short brushes, worn contacts and dirty oil are among the comments brought back and noted on a "work to be done" sheet. After the inspection trip the different items are taken up in order of importance and corrected as soon as possible. This list should be cleaned up every week and a new one started every Monday.

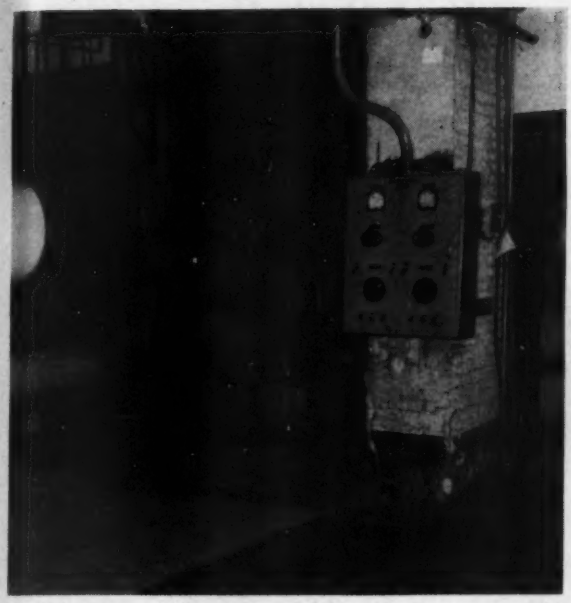
Use high quality materials

Another essential of a good maintenance program is to use high quality materials and to make the necessary installations conscientiously. The initial difference in cost between good and poor equipment properly installed can be marked off in just one breakdown. For example, the output value of one of our paper machines is rated at almost $900 an hour. With actually thousands of points of electrical contact that keep this machine operating, the failure of many of these parts could cause considerable damage as well as expense. Parts of this machine are subjected to a continual spray of moisture. Thus it is easy to see why the quality of the materials must be the very best. The best equipment, however, can be ruined by a poor installation or by careless handling. With this in mind, every installation should be planned carefully and special consideration given to the amount of moisture, heat, and vibration present.

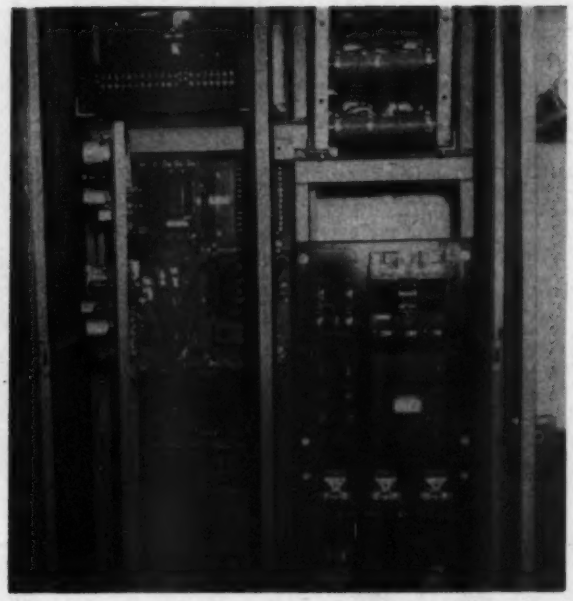
Have an adequate supply of spare parts

A requirement of any maintenance program is to have an adequate supply of spare parts. The ideal would be to have a complete set of spares for everything in use, but this of course would lead to prohibitive expenditures. The actual quantity of spare parts can be reduced in several ways. For instance, an inspection of the stock carried by

*As told to Francis A. Westbrook.



Control panel and drive motors on the reel; the tension on the center wind reels are controlled by rototrols



Master control panel; all panels plug in and are quickly replaced

nearby dealers will give an idea of the items that are readily available from such regular sources of supplies. Also, when ordering pieces of equipment we always try to get the same type, style, and make which we have in use in the plant and for which we already have spare parts. However, when a new improved item of equipment has been successfully applied, we change over to it rather than continue with obsolete items. The secret of having the right parts on hand is not luck but the result of careful study of the abuse to which each is subjected, and also a knowledge of its expected life.

Full cooperation of the organization

Another very important matter in good maintenance practice is the full cooperation of the whole organization. The foreman (or chief electrician) must be willing to listen to the ideas of his men, because they very often are in more intimate contact with the problem. He can discourage poorly thought-out suggestions, but he must be willing and able to encourage constructive and helpful ideas. Also the foreman must never ask unreasonable work or give jobs that he would not or could not do himself. His directions and orders to his men must be clear and accurate. Above all he must be fair to his men as well as to the company. The electrical department and the foreman must be given the necessary tools and testing equipment to perform their work. His orders for materials must be honored and carried out. The men in return should not be careless with materials, tools, or instruments. Nor should company goods be taken without authorized permission.

The following is an analysis of the responsibilties of the electrical department which have been discussed sufficiently in the foregoing paragraphs to make its purpose clear. It is signed by a company officer and is posted on the electrical department's bulletin board.

I.—Preventive Maintenance
1. Weekly check of all motors, switches and wiring.
   a. Monday morning oiling.
   b. Noting on check list where maintenance is required.
   c. Making the necessary repairs at once or in maintenance meeting make arrangements for Sunday work.
2. Monthly inspection made against check list covering the following:
   a. Resistance reading.
   b. Condition of windings, stator and rotor.
   c. Condition of wiring and switches.
   d. Condition of commutator or brush ring and bearings.
   e. Condition of drive including coupling, belt, gears, etc.
3. Maintain adequate spare parts such as brushes, bearing, and load heaters, switches, etc.
4. Cross file all essential motors with non-essential and spare motors to cover possible breakdowns with the most available motor.

II.—Card File System on all Motors
1. Card filled out for each motor showing:
   a. Description of motor.
   b. Location and machine being driven.
   c. Type of switch gear.
   d. Spare which can be used in case of failure and spare parts on hand.
   e. Description and date of all repairs.
   f. Results of all monthly inspections.
2. All motors numbered
   a. Motors numbered corresponding to number on file card.
   b. All switches and starting buttons marked with corresponding numbers to those on motors.
   c. Switches and starting buttons marked with machine they control.

III.—Perform Repairs as Indicated by Weekly and Monthly Check Forms
1. Schedule this work either during the week when the motor is idle or make arrangements for Sunday work.
2. If outside work is necessary contact manufacturers or firm who can make repairs.
3. See that the necessary parts are on hand before work begins.

IV.—The following machines will fall under the responsibility of the Electrical Department and will be checked weekly and monthly same as the motors and switches.
1. Otis Elevator.
2. Hydraulic system operating beater bed plate.
3. Instrument panels and speed indicators.
4. Electric trucks in Finishing Department.

V.—Plan Layout and Install New Electrical Equipment
1. When new equipment is considered:
   a. Contact manufacturers for quotation.
   b. Make sure of needs and requirements.
2. Lay out the wiring and locations of parts.
3. Install new equipment, see that operation is satisfactory and include in maintenance schedule.

Pulpwood Operation and Handling

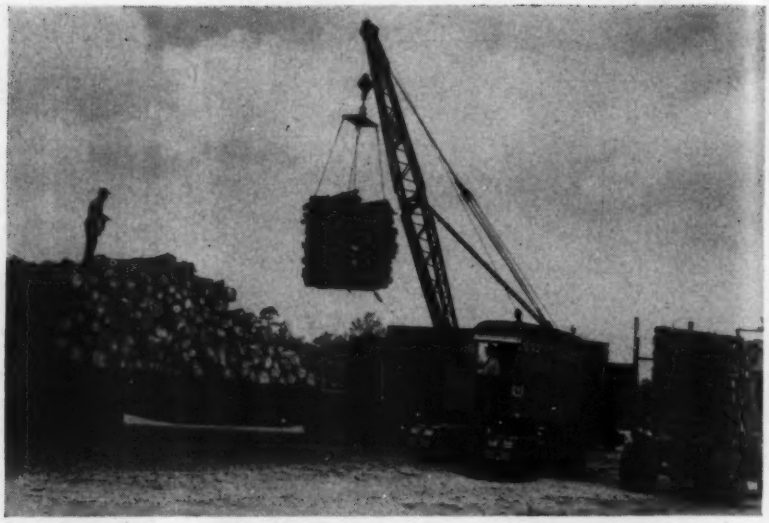


Fig. 1. Link-belt Speeder crane transfers pulpwood from the cradles to the rack car. Complete loading operation — 20 minutes

Crane with Cradles Speeds Pulpwood Operation

Crane and new cradles for truck bodies step up woodlands output for Claxton Wood, Inc., in Claxton, Ga.

Tidewater Equipment Company, Brunswick, Ga., has developed "the Dixie Logger" which consists of six demountable reinforced steel-pipe cradles, two angle-steel skids to form a portable ramp for sliding the cradles on and off the truck, and a winch to pull the cradles onto the truck.

The truck carries two cradles, while the remaining four cradles are left in the woods where they are loaded, at ground level, by logging crews. When the truck returns it leaves two empty cradles, and picks up two loaded cradles by means of the portable ramp and winch, and transports cradles and pulpwood to the rail-siding, where a Link-Belt Speeder LS-52, equipped with special slings, transfers the pulpwood into a rack car. The loading operation of the rack car is completed in 20 minutes.

This equipment insures efficient and continuous pulpwood operation by eliminating the necessity of tying up the truck, as in the case of conventional loading, or of piling up logs on the ground prior to loading.

Fig. 2. View of empty pulpwood cradles

Fig. 3. Pulpwood cradle with adjusted cables during unloading

26"x36" sheets, made from the finest linen rags and costing $125 a ream, were produced in 1817 by Thomas Ames of Philadelphia for a printing of the **Declaration of Indepedence**.

England's pioneer papermaker, Spielman, was knighted after **King James I** personally visited his mill about *1605*....

The top **PAPERMAKING** machine speed in 1867 was 100 feet a minute. Just 13 yrs later, this speed had been *doubled!*

Odd Bits

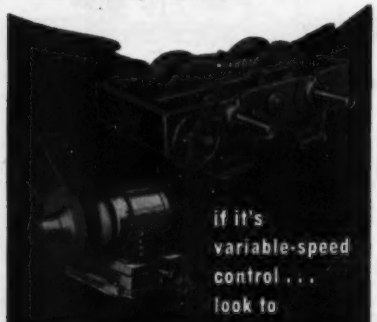
A bed sheet of paper, absorbent on one side and waterproof on the other, is expected to prove a boon to hospitals and those having to care for infants.

RUGGED, RELIABLE

VARIABLE-SPEED CONTROL

CONSIDER THE IMPORTANCE OF LEWELLEN LEVER & LINK SUSPENSION. This distinctive feature distributes equally the thrust bearing load on every ball in the bearing, at all speeds and positions, and while changing speeds. Thrust bearings are mounted at outer end of disc hub. When lever moves, discs move positively; belt is not required to force discs apart. Here's smooth operation!

THEN, NOTE PARTICULARLY — the Lewellen DOUBLE-BLOCK, UNI-TIP BELT keeps tension at a minimum on belt, bearings, and shafts. UNBREAKABLE BELT SPLICE — an outstanding feature for uninterrupted operation. SIMPLE, POSITIVE LUBRICATION SYSTEM for disc hubs, keys, and shaft.



if it's variable-speed control . . . look to

LEWELLEN

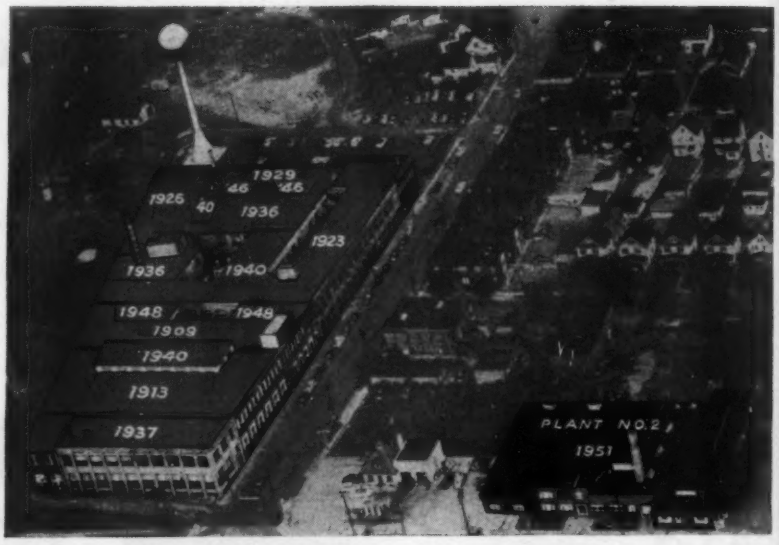
TRANSMISSIONS • MOTOR PULLEYS

Open or enclosed, vertical or horizontal Variable-Speed Transmissions in all sizes from fractional h.p. to 60 h.p. . . . Variable-Speed Motor Pulleys in all ratings from fractional to 7½ h.p. Speed range, 3 to 1 for all pulley sizes. (One size—2¾ to 1.)

Service in variable-speed control exclusively for more than 50 years. May we help you?

LEWELLEN MANUFACTURING CO.
COLUMBUS, INDIANA

The Paper Industry Allied News



FIFTY YEARS of growth is shown in this air view of Lindsay Wire's plant in Cleveland; plant No. 2 at right is the latest acquisition

Lindsay Marks 50th Year

One of the nation's exclusive manufacturers of fourdrinier wires for paper machines marked its 50th anniversary recently at a dinner dance in Cleveland. More than 600 employees and guests of Lindsay Wire Weaving Co. attended the celebration, which was held at the Hotel Statler.

Principal speaker was Fred L. Crossman, president, who attributed the firm's success in part to its 340 "skilled and loyal employees;" and to the late Fred A. Crossman, who was president from 1932 to 1950, and to the late Hamilton Lindsay, who founded the firm in 1903.

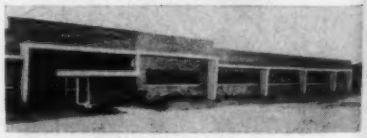
Lindsay now has under construction a loom that will be the nation's largest.

Ronningen-Petter Succeeds Ronningen Engineering

Ronningen-Petter Co. of Vicksburg, Mich., has been announced as the successor firm to Ronningen Engineering Sales. The same personnel has been maintained. The firm is Midwest representative for A. E. Broughton & Co. of Glens Falls, N. Y.; Brown-Singer Co. of Middletown, Ohio; Bulkley-Dunton Processes Inc. of New York, N. Y.; Noble & Wood Machine Co. of Hoosick Falls, N. Y., and Red Ray Mfg. Co. Inc., New York, N. Y. The company is national representative for Ronningen filters and strainers.

Papermakers Attend Albany Felt Technical Meeting

Three widely known paper mill men recently addressed the semi-annual technical sales meeting of Albany Felt Co. in Albany, N. Y. Representing the fine paper, high-grade folding box and kraft branches of the industry, they discussed "Rela-



BRASS BELLOWS will be manufactured by Flexonics Corp. in this new plant addition at Memphis, Tenn.; the building adds 30,000 sq. ft. to the firm's Memphis facilities; the Brass Bellows Division was recently formed as the result of research conducted at the company's Elgin, Ill., factory

veland;

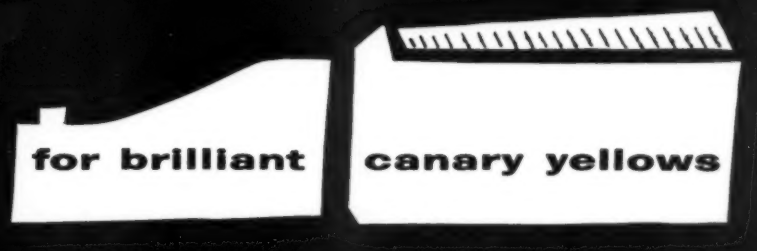
iddle-
Proc-
. Y.;
o. of
l Ray
N. Y.
senta-
and

y

mill
semi-
ng of
N. Y.
high-
nches
'Rela-

red by
tion at
30,000
es; the
formed
at the

, 1954

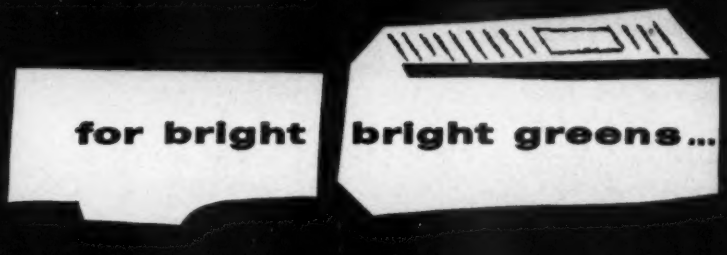


BRILLIANT PURE YELLOW 6GS EXTRA CONC.

bright, clean, clear shades of very good fastness to light

Uniform shades despite decided fluctuations in tray water pH.

For bond, ledger, index, and cover papers



Brilliant Pure Yellow 6GS Extra Conc. + Fast Bond Blue GDX or Fast Bond Green NTGG

When an acid yellow is required, you can count on Brilliant Pure Yellow 6GS Extra Conc.

Samples and circular available on request.

gdc

GENERAL DYESTUFF CORPORATION

435 HUDSON STREET · NEW YORK 14, NEW YORK

NEW YORK · BOSTON · CHARLOTTE · CHATTANOOGA · CHICAGO
PHILADELPHIA · PORTLAND, ORE. · PROVIDENCE · SAN FRANCISCO

Yarn spinning—where strands of wool called "roping" are twisted to give loftiness and strength. This type of modern 144-spindle machine (shown) has almost entirely replaced the oldtime "spinning mule."

paper is our business, too!

To furnish the wide range of Paper Machine Felts our customers need, we make over 500 different types of yarns. Each yarn is made to the exact requirements of individual paper machine conditions. Some yarns weigh as little as 4 ounces per mile; others, as much as 15 pounds. Some are hard-twisted for strength; others, soft-twisted for cushion. Our laboratory tests every set of bobbins to rigid specifications of weight, twist, tensile strength, and elasticity.

In every operation: sorting the raw wool, scouring, blending, carding, yarn spinning, weaving and finishing . . . our facilities and processes are the most modern in the textile industry. **Yet *paper making* is *really* our business, for every Albany felt is designed and manufactured to meet the special requirements of an individual machine for finish, drainage and trouble-free performance. The result: MORE TONS PER DAY.**

PRODUCTION SLIDE RULE. Ideal for the busy mill superintendent. Computes machine production for paper or board fast and accurately. Write for your FREE slide rule today.

ALBANY FELT COMPANY

World's Largest Manufacturer of Paper Machine Felts

MAIN OFFICE AND PLANT, ALBANY 1, NEW YORK

Other plants: Hoosick Falls, N. Y., North Monmouth, Maine, Cowansville, Quebec

o!

y, 1954

PHASES OF FELT application were discussed at Albany meeting by (l to r) Dana Westcott of West Virginia Pulp & Paper, Harry Hadley of Gardner Board & Carton, and W. Shannon of Macon Kraft; the meeting was held at Albany

RECENTLY PROMOTED members of the Albany staff meet with Wayne Davis (r) assistant vice president for sales; they are L. M. Woodside, chief engineer for technical field service, and R. P. Dustrude, assistant sales manager

tion of Felt Performance to Paper Machine Efficiency."

Participants were: Dana Westcott, paper mill superintendent for West Virginia Pulp & Paper Co., Mechanicville, N. Y.; W. Shannon, paper mill superintendent, Macon Kraft Co., Macon, Ga., and Harry Hadley, mill manager for Gardner Board & Carton Co., Middletown, Ohio.

Two promotions announced

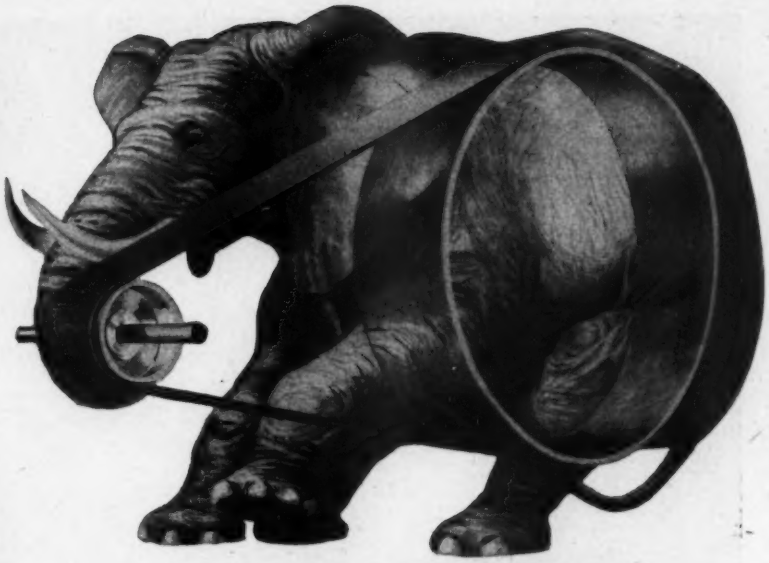
L. R. Parker, executive vice president of Albany Felt, announced two promotions during the sales conference.

Ray P. Dustrude has been named assistant sales manager, and L. M. Woodside has been made chief engineer of the technical field service. Mr. Dustrude, who joined the firm in 1945 and has been handling sales in the mid-southern states, will, along with James E. Smith, assist Wayne Davis, assistant vice president in charge of sales.

Allied Notes

Goodman Mfg. Co.

of Chicago has acquired from Diamond Iron Works, Minneapolis, its line of crushing, screening and handling equipment for the rock, sand,



PULLINGRIP

G&K Leather Belting grips the pulleys for more production-power

It Grips — Like an elephant's trunk, leather's resilient, frictional surface firmly *grips* the pulley face, causing belt and pulley to move as one power unit.

It Pulls — Leather is strong, flexible, with controlled stretch — gives peak performance on *any* drive.

It's 3-Dimensional — Leather's millions of fibres are interlaced to form the tough *three-dimensional* structure so necessary for PULLINGRIP — *developed to the highest degree in G&K Leather Belting.*

Call your G&K Industrial Supplies Distributor for flat, round, link and V-belting, belt lacing, dressings, cements, packings and specialty leathers. Write for free Belting Catalog 101.

GRATON AND KNIGHT

a-2

Memo: **Paper Mill Superintendents**

Here's a drive you can depend on — if the belting is G&K leather. Every drive in the mill — from beaters to take-off reels — must keep pulling at top efficiency with minimum stretch. That's why superintendents specify G&K RESEARCH® brand for top tonnage output.

GRATON & KNIGHT Company

WORCESTER, MASSACHUSETTS

All Teflon† Yarn
LATTICE BRAID* PACKING

For Service Against the Most Destructive and Corrosive Acids on Pump Shafts and Valve Stems

THIS new Teflon packing is *not* just another braided packing made from Teflon ribbon. It is a *totally* different packing made from an all-new Teflon yarn. The yarn is woven tightly by the patented LATTICE BRAID method into a relatively dense, firm braid with no large voids. Garlock can furnish Teflon yarn packings in two styles—

No. 5883 LATTICE BRAID packing—composed 100% of Teflon yarn.
No. 5888 LATTICE BRAID packing—composed of 100% Teflon yarn and treated with Teflon suspensoid.

They are furnished in coil and ring form in sizes 1/8" to 1½". Both packings are superior to any other types of braided Teflon packings for service against the *most* destructive or corrosive acids at high pressures and temperatures up to 500° F. For example, note this service report—

Duplex pump, 1⅝" shaft, ⅜" packing size, pumping sulfuric acid at 12,000 p.s.i. New Teflon yarn packing was installed. Customer reports that *after 1400 hours* they added 2 rings and are still operating. (Best prior service was 330 hours with a blue asbestos braided packing with Teflon suspensoid.)

Contact a Garlock representative at the sales office nearest you. Get his recommendations on the new Teflon yarn packings and on other Garlock Teflon products.

THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK

Branch Offices: Baltimore • Birmingham • Boston • Buffalo • Chicago • Cincinnati • Cleveland Denver • Detroit • Houston • Los Angeles • New Orleans • New York City • Palmyra (N.Y.) • Philadelphia Pittsburgh • Portland (Ore.) • Salt Lake City • San Francisco • St. Louis • Seattle Spokane • Tulsa

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

*Registered Trademark. †du Pont's Trademark for its tetrafluoroethylene resin.

GARLOCK

PACKINGS, GASKETS, OIL SEALS
MECHANICAL SEALS
RUBBER EXPANSION JOINTS

and gravel industries; and its line of hogs and chipmills for the paper, wood, and meat packing industries.

Rodney Hunt Machine Co.
of Orange, Mass., has announced the appointment of Industrial Heat Engineering Co. of Greenville, S. C., as sales and service representative in the southeastern states.

Myers & Addington,
New York, N. Y., consulting engineering firm, has been dissolved. Two of the partners, David Moffat Myers and Michael Pope, have joined the staff of Seelye Stevenson Value & Knecht.

F. C. Huyck & Sons,
Rensselaer, N. Y., manufacturer of papermakers' felts, has announced that its field engineering staff is now the largest in the industry.

Black-Clawson Co.
has announced that its Shartle Bros. Machine Div. at Middletown, Ohio, will build and sell the new Shartle Strindlund tube type filter under licensing agreements with A. B. Ekstroms Maskinaffar of Sweden.

•

D. O. Lachmund has been named vice president in charge of sales for **Amercoat Corp.**, manufacturer of protective coatings. . . . Hugh J. Bolger, formerly with Pacific Coast Supply Co., has been named West Coast sales representative for **Cameron Machine Co.**

E. Paul Easton
Lockport Felt

R. S. Buckley
Lockport Felt

Lockport Felt Co. of Newfane, N. Y., has recently announced two staff appointments: E. Paul Easton has been named to the southern sales staff, and Richard S. Buckley to the field service engineering staff. Prior to joining the firm, Mr. Easton was a sales and service engineer with Hercules Powder Co. Mr. Buckley was at one time associated with the Pulp Division of Weyerhaeuser Timber Co. and has served as technical director and mill superintendent for West Coast paper manufacturers.

Take a look at some of the many operations that build precision into Lodding Doctor Blades

LODDING ENGINEERING CORPORATION
WORCESTER, MASSACHUSETTS
REPRESENTED BY
W. E. GREENE CORPORATION • WOOLWORTH BLDG., NEW YORK

The Paper Industry Association News

Radioisotopes in Papermaking Discussed at Ohio Tappi

That radioisotopes are very useful to the paper industry but are not all-powerful was the view expressed at the December meeting of the Ohio Section of Tappi by Dr. C. A. Sankey, research director for Ontario Paper Co. Ltd. More than 120 members and guests attended the gathering, which was held at the American Legion Hall in Middletown, Ohio.

Dr. Sankey declared that "newsprint production is in the pioneer stage in spite of the progress that has been made. The biggest problem inherent in high-speed production is variation on the paper machine, consisting of eddies, whirls and stray currents. This variation problem becomes more difficult as higher speeds are attained. Any tool that will give more information on this subject can be very helpful. Radioisotopes are in the group of such tools that are useful in studying high-speed paper machine variations."

The speaker described Ontario Paper's mill at Baie Comeau, Que., which has two machines producing newsprint at speeds of 1700-1800 fpm.

Tagged fibers

In order to follow fiber through the mill process, Dr. Sankey said, certain fibers are tagged with absorbed radioisotopes and mixed with the main stock stream. Any flow can be traced by this technique. The speaker pointed out, however, that if information obtained on stock flows is useful, the radioisotope tool is useful. Otherwise, no.

According to the method used by Ontario Paper (developed in conjunction with the Pulp and Paper Research Institute of Canada), the choice of radioisotope for use in tagging fibers is dependent on the following: (1) The isotope must be absorbed; (2) the isotope must be one which will not harm regular production and can be followed by established techniques, and (3) the isotope must therefore have a short half-life so as not to harm personnel and yet long enough to permit shipping, handling and experimental runs.

Radioiodine has a half-life of eight days and is an ideal tagging material.

NEWLY ELECTED officers of the Paper Mill Men's Club of Southern California are (l to r) Asa L. Murray Jr. of Oregon Pulp & Paper Co., treasurer; Jack L. Perrin of Towlsaver Inc., secretary; B. E. Calhoun of Marathon Corp., vice president, and J. C. Fischer of Sherman Paper Products, president

Tappi and CPPA Schedule Joint Symposium at Appleton

The fundamental research committees of both Tappi and CPPA will sponsor a four-day symposium on "The Fundamentals of the Paper Machine" at the Institute of Paper Chemistry in Appleton, Wis., Sept. 21-24.

Speakers will concentrate on principles rather than on engineering design or papermaking "art." The program will cover the following general subjects: (1) Properties and handling of fiber suspensions; (2) mechanical water removal from fiber suspensions and mats; (3) cohesion, adhesion, and felting properties of fibers; (4) the mechanism of heat transfer and water removal and the effect on sheet properties, and (5) compression and stressing of fiber mats.

The following specific topics will be included: Flow in Fiber Suspensions and the Effect of Turbulence; Specific Effect of Flocculation and of Air and Foam on Fiber Suspensions; The Hydraulics of the Slice; Theory and Application of the Concept of Filtration; Water Removal by Table Rolls; Three Dimensional Structure of Fiber Suspensions; Relation of Water Removal to Two-sidedness; Water Removal by Means of a Dynamic Suction Box; Fiber Properties Involved in Adhesion, Cohesion, and Felting; Studies of the Wet Web Under High Rates of Elongation; Effect of Water Removal on Sheet Properties; A New Method for Evaluating the Draw; Fundamentals of Wet Pressing; Introduction of Strains into the Sheet on Drying, and Compression and Stressing in Calendering and Supercalendering.

Although the speakers cannot be listed at this time, it is expected that technical experts will attend from Great Britain, Sweden, Finland, Norway, Germany, Canada, and the United States. The chairmen of the two cooperating committees are K. C. Logan of Northeastern Paper Products Ltd. for CPPA, and Harry F. Lewis of the Institute of Paper Chemistry for Tappi.

Seventh Bolton Award Competition Announced

John W. Bolton & Sons Inc. of Lawrence, Mass., has announced the launching of the Seventh Bolton Award Contest. The subject for the competition is, "The Obligation of an Employee to his Company."

As in the past, the contest will be held under the sponsorship of the Superintendents Association. Cash awards will cover 13 prize-winning papers — three national and 10 divisional winners. The first national award will be $1000; the second, $750, and the third, $500. Each divisional award is in the amount of $100.

The contest is open to all employees of North American pulp and paper mills. It is not confined to the membership of the Superintendents Association. Papers should be held to within 1500 words and should be typewritten (double-spaced) on one side of 8½-in. by 11-in. sheets. All entries should be mailed to the secretary-treasurer of the American Pulp & Paper Mill Superintendents Association, 327 S. LaSalle St., Chicago 4. They should be post-marked no later than midnight, March 31.

Roberts Elected by CPPA Western Division

Paul E. Roberts, vice president and general manager of Alaska Pine & Cellulose Ltd., has been elected chairman of the Western Division of the Canadian Pulp & Paper Association.

Members of the executive committee for 1954 are as follows: Walter C. Koerner, president of Alaska Pine &

Cellulose; L. L. C. Bentley, vice president of Canadian Forest Products; Wentworth Brown, vice president of Columbia Cellulose; H. J. Mackin, president of Elk Falls; B. M. Hogmeister, president of MacMillan & Bloedel; Paul E. Cooper, president of Pacific Mills; Harold S. Foley, president of Powell River; J. A. Craig, vice president and general manager of Sidney Roofing & Paper; E. M. Herb, president of Westminster Paper.

•

Coming Events

TAPPI

Feb. 15-18—39th Annual Meeting, Commodore Hotel, New York, N. Y.
March 9—Lake States Section, Wausau Club, Wausau, Wis.
March 9—Ohio Section, Manchester Hotel, Middletown, Ohio
March 19—Pacific Section, West Linn, Ore.
March 19—Southeastern Section, George Washington Hotel, Jacksonville, Fla.
March 25—Delaware Valley Section, Engineers' Club, Philadelphia
April 8—Ohio Section, National Starch Products Inc., Indianapolis
April 13—Lake States Section, Forest Products Laboratory, Madison, Wis.
April 22—Delaware Valley Section, Engineers' Club, Philadelphia
May 24-26—Fifth Coating Conference, Poland Spring House, Poland Spring, Maine.

American Pulp & Paper Mill Superintendents Association

February 25—Miami Valley Division, American Legion Hall, Middletown, Ohio
March 25—Miami Valley Division, American Legion Hall, Middletown, Ohio
April 20—Miami Valley Division, American Legion Hall, Middletown, Ohio
May 6-7—Northwestern Division, Leamington Hotel, Minneapolis
May 14-15—Pennsylvania-New Jersey-Delaware Division, Yorktowne Hotel, York, Pa.
May 20-21—Pacific Coast Division (joint meeting with Pacific Coast Tappi), Gearhart Hotel, Gearhart, Ore.
June 21-23—National Meeting, Sheraton-Mount Royal Hotel, Montreal, Que.

Other meetings

Feb. 14-19—American Paper & Pulp Association, annual meeting, Waldorf-Astoria Hotel, New York, N. Y.
Feb. 16—Salesmen's Association of the Paper Industry, annual luncheon, Waldorf-Astoria Hotel, New York, N. Y.
March 20-24—Envelope Manufacturers Association of America, spring meeting, Hollywood Beach, Fla.
March 29-31—National Paper Trade Association, annual convention, Waldorf-Astoria Hotel, New York, N. Y.
April 3-4—Packaging Machinery Manufacturers Institute, spring meeting, Hotel Dennis, Atlantic City, N. J.
May 2-6—Electrochemical Society Inc., LaSalle Hotel, Chicago
May 5-7—Forest Products Research Society, annual meeting, Grand Rapids, Mich.

NASH ENGINEERING COMPANY
423 WILSON AVE., SO. NORWALK, CONN

The Paper Industry Names in the News

Crittenden Named Superintendent at Calhoun by Bowaters

The appointment of A. Jay Crittenden as paper mill superintendent for Bowaters Southern Paper Corp. at Calhoun, Tenn., has been announced by the firm as effective November 1, 1953. Mill operation is expected this spring.

Mr. Crittenden was most recently associated with Coosa River Newsprint Co. as paper mill superintendent. He had previously served in the same capacity with Southland Paper Co., Lufkin, Texas. In earlier years he had extensive experience in the Canadian newsprint industry.

A. J. Crittenden

Geo. E. Mackin

Mackin Named Executive VP of Green Bay Paper & Pulp

George E. Mackin, general manager of Green Bay Paper & Pulp Co. of Green Bay, Wis., was named executive vice president of the firm at a recent meeting of the board of directors.

Identified with the development of the semichemical processes for pulp and papermaking, Mr. Mackin was for some years an industrial specialist and in charge of the papermaking section of the Division of Pulp and Paper at the U. S. Forest Products Laboratory in Madison, Wis.

L. W. Shattuck Elected Strathmore Vice President

Laurence W. Shattuck, who has been general superintendent, was recently elected vice president in charge of production for Strathmore Paper Co., West Springfield, Mass. The position was formerly held by Cassius M. Bryan in addition to his duties as chairman of the board.

Mr. Shattuck joined Strathmore in 1913 and has held various positions in the order, finishing and manufacturing departments in both the West Springfield and Woronoco mills. From 1930 to 1947 he was superintendent of No. 1 mill at Woronoco. In 1947 he became assistant to the vice president in charge of production. He was named general superintendent in March 1950.

In addition to being a director and member of the Strathmore executive committee, Mr. Shattuck is a director of Keith Paper Co. of Turners Falls. (Keith was recently purchased by Strathmore.)

L. W. Shattuck

M. L. Haggerty

Martin Luther Haggerty, vice president and director of George LaMonte & Son, Nutley, N. J., was recently honored at a surprise celebration of his 50th anniversary with the firm, founder of the safety paper industry.

Charl deWet, technical staffer at the Kimberly-Clark Corp. research and development laboratories for 31 years, retired December 26. He joined the firm in 1922 at Niagara Falls, N. Y., and eight years later was named to the staff at Kimberly.

Champion P&F Names Scholl

The Champion Paper & Fibre Co. has named Richard Scholl as coordinator of pulp and by-product production, with offices in Hamilton, Ohio. According to President Reuben B. Robertson Jr., the move was made in order to further the firm's production and quality program.

Prior to joining Champion in 1935, Mr. Scholl spent 13 years with three leading pulp and paper manufacturers in supervisory capacities. With Champion he has held a number of responsible positions at each of the organization's three divisional mills: Canton, N. C.; Pasadena, Texas, and Hamilton. Previous to his latest assignment, he was general superintendent of the Carolina Division pulp mill.

In assuming his new duties, Mr. Scholl will be concerned principally with staff supervision over Champion's manufacture of pulp and by-products; counselling in matters pertaining to pulp and by-product problems; studies as concerned with quality performance; costs and budgets, as well as a close liaison affiliation with the firm's research program.

A. B. Recknagel

E. N. Eisenhower

Recknagel Retires as St. Regis Forestry Director

Arthur B. Recknagel has retired as technical director of forestry for St. Regis Paper Co. However, he will continue on a consulting basis, assisting in the scholarship program that the firm has established for students in forestry.

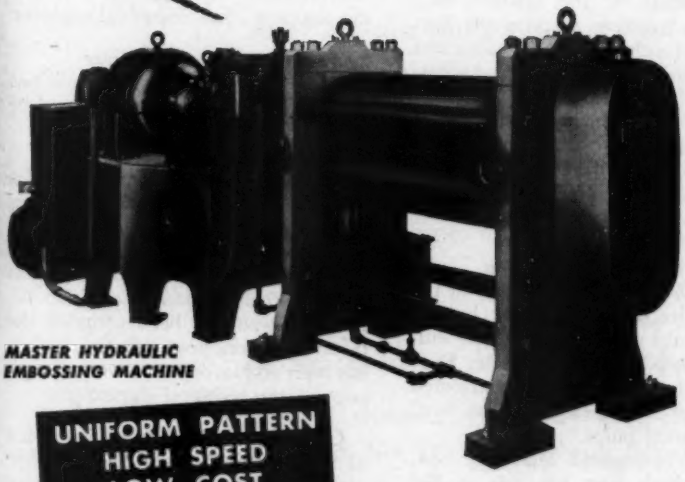
Mr. Recknagel assumed his present position with St. Regis in 1947. He had previously served as head of the forestry department of the University of British Columbia in Vancouver; as area forester with the U. S. Forest Service, and as professor of forestry at Cornell University in Ithaca, N. Y. He is a member of the forest policy committee and the forest industrial council of the American Pulp & Paper Association.

St. Regis has also announced the election of Edgar N. Eisenhower, brother of the President, to the board of directors to fill the vacancy created by the death of William K. Dick. He is senior partner in the Tacoma, Wash., law firm of Eisenhower, Hunter, Ramsdell & Duncan.

NOW—WITHOUT ADDITIONAL LABOR

3 to 5 TIMES MORE

- **EMBOSSING**
- **PAPER FINISHING**
- **OFF-MACHINE CREPING**



MASTER HYDRAULIC EMBOSSING MACHINE

UNIFORM PATTERN
HIGH SPEED
LOW COST

With the NEW

MASTER *Hydraulic* EMBOSSING MACHINE

and

ENGRAVED MATCHED HARDENED FORGED STEEL ROLLS

The GREATEST Development in the History of Embossing

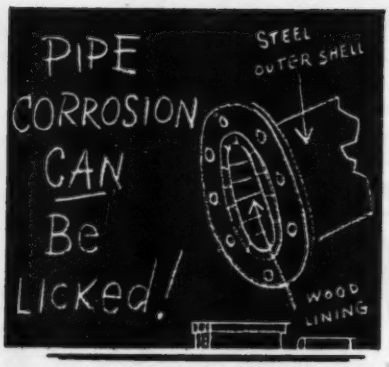
The new high-speed method of embossing that will emboss or finish up to 1,000 feet per minute producing day after day, year after year, uniform high quality embossing not duplicated by any other method or machine.

Reduces scrap, eliminates lost production due to fractures in paper filled backup rolls caused by splices and material variation; will likewise eliminate costly backup roll repairs and replacement.

ENGRAVED MATCHED HARDENED FORGED STEEL ROLLS
U. S. Pat. No. 2,662,002
Other U. S. and Foreign Patents Pending

© 1953 Modern Engraving & Machine Co.

MODERN ENGRAVING & MACHINE CO.
1413 CHESTNUT AVE., HILLSIDE 5, NEW JERSEY

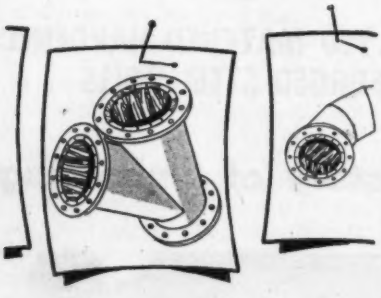


and it's as easy as MPC!

MPC Wood-Lined Steel Pipe is the efficient and economical answer wherever corrosion, abrasion, frictional resistance or sliming is a problem.

Ideal for corrosive liquids, gases and fumes including aggressive waters, industrial waste liquors, pulps, slurries, acid, alkali and salt solutions.

For service up to 180° F. and 250 p.s.i. Higher pressure ratings for special service requirements. All pipe flanged and available in 10' and 20' standard lengths or "tailor-made" to your specifications. Easy to cut and reflange. All flanges have standard ASME bolt circle.



Woodlined fittings are available in standard and special designs for all diameters. For catalog and additional information write Dept. PI.

EST. mpc 1869

MICHIGAN PIPE COMPANY

Bay City • Michigan

Manufacturers of Wood-Stave, Saran Rubber-Lined, Stainless Steel and Monel Piping. Represented nationally by Saran Lined Pipe Co. Detroit, (Ferndale) Michigan.

Appointments Announced by Pulp & Paper Institute

The appointment of Dr. Theodor N. Kleinert of Vienna, Austria, to the senior research staff of the Pulp and Paper Research Institute of Canada has been announced in Montreal by Dr. L. R. Thiesmeyer, president of the Institute. Dr. Thiesmeyer also revealed the exchange for a one-year period of Dr. Alan Robertson of the Institute staff and Dr. Olle Andersson of the Swedish Forest Products Research Laboratory in Stockholm.

Well known to the North American pulp and paper industry through his many patents and publications, Dr. Kleinert has for some 10 years been chief of research and development for Zellwolle Lenzing A. G. in Austria. His work at Lenzing, comprising some 40 published papers and 20 patents, ranged from fundamental studies of fiber structure to the utilization of waste sulfite liquors.

A graduate of the Institute, Dr. Robertson has been studying the flocculation of pulp fiber suspensions and the formation of paper. Dr. Andersson's research work has been concerned with the hydrodynamic problems of pulp suspensions. While at the Institute he will study the behavior of pulp fibers during screening and the formation of paper.

Bowker Retires at Eastern

Thad W. Bowker, a pioneer in the manufacture of sulfite pulps, has retired as pulp mill superintendent with Eastern Corp. in Lincoln, Maine. During his long career he contributed greatly to the development of hard and softwood pulps.

Born in Springfield, Maine, in 1884, Mr. Bowker's first job was in the wood room at the Millinocket mill of Great Northern Paper Co. He then was on the staff of the West Enfield mill of International Paper Co., later being transferred as foreman to the Ticonderoga, N. Y., plant.

In 1914 Mr. Bowker returned to Lincoln in the employ of Eastern. He was made foreman in 1919 and pulp mill superintendent in 1935.

Riley Retires as Powell River Supt.; Joins Dan Charles

Fred R. Riley, general superintendent of paper mills for Powell River Co. Ltd., has announced his retirement effective January 1. He will remain at Powell River in a temporary advisory capacity during the current installation of the couch transfer on No. 8 machine. Mr. Riley will then join the sales staff of Dan Charles Co. of Seattle, paper mill equipment firm.

Beginning his career with Crown Willamette Paper Co. in 1913, Mr. Riley was later associated with Cloquet Paper Co., Inland Empire Paper Co. and Pacific Mills Ltd. In 1922 he joined Powell River as a back tender.

F. R. Riley

A. Van Allen

Succeeding Mr. Riley as PR general superintendent is Alexander Van Allen. He had been assistant general superintendent since September, having joined the firm in 1913 as a technician in the control division. In 1949 he was named assistant sulfite superintendent and in 1952 became the company's first industrial engineer.

Consolidated Names Four

Three personnel changes and one staff addition have been announced by Consolidated Water Power & Paper Co. of Wisconsin Rapids, Wis.

Stratton Martin, Biron Division chemist, has been appointed secretary to the vice president and coordinator of plants and processes; Jack E. Chinn has been named Wisconsin Rapids Division chemist, succeeding John W. Barrette, who has been assigned the Biron Division post. Percy J. Cox has been employed as a chemical engineer in the technical department.

Guerdon L. Dimmick, inspector of forest fire control and an employee of the U. S. Forest Service since 1934, has retired. For the past eight years he has worked with state conservation departments in the north central region and has contacted manufacturers to interest them in fire fighting equipment developed by foresters for specific needs.

Alexander Calder Jr., executive vice president and director of Union Bag & Paper Corp., has been named a trustee of the Bank of New York.

Ted Sooy, quality control chief for the Gardner Board & Carton Co., has resigned to become production manager for Wolverine Carton Co. of Grand Rapids, Mich. Mr. Sooy joined Gardner in 1934, was promoted to foreman of the board mill coating department in 1937 and in 1940 became superintendent of the coating operations. He became chief of quality control in 1948.

Allen

3, Mr. Cloquet er Co. 922 he tender. general Van general ; hav- a tech- n. In sulfite became gineer.

d one ced by Paper

vision cretary inator Chinn Rapids an W. d the Cox engi- at.

ector em- ervice e past state the con- them loped

utive Union imed York.

chief Co., ction Co. Sooy pro- mill d in the chief

1954

If You Want

1. More Uniform Sheet Moisture Control

2. Greater Production

This Offer Will Interest You:

The Armstrong Sheet Moisture Control for paper machines has been developed, and proven in service, to such a degree that we will let it prove itself in your mill on a *free trial basis* for 90-days.

We will ship you a complete control and supervise its installation. If it does not give you better control of sheet moisture than you are now experiencing or does not *completely satisfy you in every respect,* you may return it within 90-days and owe us nothing.

You will admit we must be sure of this Control or we could not afford to make such an offer.

It doesn't cost anything to take a look at Bulletin No. 268, describing the Armstrong Control. Just clip the coupon to your letterhead and mail it to us. There is no obligation.

ARMSTRONG MACHINE WORKS

816 Hoffman Street • Three Rivers, Michigan

MOISTURE CONTROL
INDIVIDUAL DRYER TEMPERATURE CONTROL
DRYER DRAINAGE TRAPS
THERMAL AIR ELIMINATORS
STEAM HUMIDIFIERS

• ● •

ARMSTRONG MACHINE WORKS
816 Hoffman Street, Three Rivers, Michigan

Please send Bulletin describing your Moisture Control for paper machines.

Name_____

(CLIP TO YOUR LETTERHEAD AND MAIL)

now even better

SKF Triple-Seal "SAF" PILLOW BLOCKS

BETTER Because SKF's Type "C" Spherical Roller Bearings . . . .

Increase capacity 25% to 50%
increase service life 2 to 3½ times

The big news in bearings—news from SKF—is the Type "C" Spherical Roller Bearing—as a replacement for ordinary sphericals, size for size, lasts *2 to 3½ times longer, increases capacity up to 50%.*

This improved design is now available in SKF's famous Triple-Seal "SAF" Pillow Blocks.

You get this longer life and increased capacity *in addition* to—

- Effective sealing from dirt.
- Lubricant retention.
- Adapter mounting for tight fits on standard shafting.
- "Free" or "Held" design.
- Easy installation and inspection.
- Self-alignment.
- NO INCREASE IN COST!

YOUR SKF DISTRIBUTOR will give you complete details about the "C" bearing and a copy of SKF Bulletin No. 365 which contains technical data, sizes available, increased life and capacity you can expect for each size.

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.
—manufacturers of SKF *and* HESS-BRIGHT *bearings.*

7521

SKF®
BEARINGS AND
PILLOW BLOCKS

R. A. Wallace

F. W. Hesser

S. E. Soderbergh

F. E. Endriss

Federal Paper Board Elects

New officers of Federal Paper Board Co. Inc. of Bogota, N. J. were announced recently by President John R. Kennedy. Robert A. Wallace and Frederick W. Hesser were elected vice presidents; Sven E. Soderbergh, treasurer, and Ferdinand E. Endriss, comptroller.

Mr. Wallace, elected secretary of the firm in 1948, will still hold that office. Mr. Hesser, with Federal since 1941, is chief of paperboard production. Mr. Soderbergh, comptroller since 1943, takes over his new post from Mr. Kennedy, who has served in the dual capacity of president and treasurer. Mr. Endriss is treasurer of National Folding Box Co. of New Haven, Conn., a newly acquired Federal subsidiary. He will make his headquarters at the Federal executive offices in Bogota.

George H. Pearce, safety officer of Bathurst Power & Paper Co. Ltd., has been promoted to the post of superintendent of plant protection and safety, succeeding the late Robert M. Young.

Harold L. Mitchell, director of the Southern Forest Experiment Station at New Orleans, has been made chief of the division of silvicultural relations at the U. S. Forest Products Laboratory in Madison, Wis. He will head research on the growing and breeding of trees for specific purposes.

Edward C. Roney of Detroit, president and general manager of Roney-Cramer Co., has been elected a director of River Raisin Paper Co.

The Paper Industry Necrology

Palmer J. Lathrop

Palmer J. Lathrop, president of Cameron Machine Co. of Brooklyn, N. Y., drowned December 26 in an attempt to rescue his dog from the reservoir of Commonwealth Power Co. in Millburn, N. J.

Mr. Lathrop had served as president of Cameron Machine since 1949, when he succeeded the late Harold Kinsey. Prior to his association with the firm, he had been vice president in charge of production for Bristol-Myers Co.

P. J. Lathrop

E. A. Page

Edward A. Page

Edward A. Page, 51, staff supervisor of safety for Kimberly-Clark Corp., died unexpectedly January 19 in Milwaukee. Mr. Page was attending a meeting of the Wisconsin Council of Safety and was to have been chairman of the opening session.

A life-long resident of Menasha, Wis., Mr. Page was renowned throughout the country for his active leadership in the safety movement. He was a member of the executive committee of the National Safety Council and served as chairman of its Pulp and Paper Section in 1946-47.

Mr. Page was a graduate of Marquette University and the Columbia School of Drafting, joining the Kimberly-Clark staff in 1924. He was employed initially at the corporation's Niagara and Atlas mills, and after a background of personnel department service at both Atlas and Neenah he was named staff safety supervisor. (The Niagara mill was awarded the Edward Benton Fritz Memorial Trophy for accomplishment in safety in 1945-1946.)

Aside from his work with the National Safety Council, Mr. Page was vice president of the Wisconsin Council of Safety and president of the Twin Cities Safety Commission in Neenah-Menasha.

Ann Mae Thorpe

Miss Ann Mae Thorpe, 86, president and treasurer of Fort Miller Pulp & Paper Co., died at Fort Miller, N. Y., December 20. A graduate of Wellesley College, she assumed the management of the firm in 1908 upon the death of her father. (Fort Miller Pulp & Paper is under lease to Marinette Paper Co., wholly owned subsidiary of Scott Paper Co.)

Edward H. Low

Edward H. Low, 74, prominent authority on Ontario's water resources, died January 1. He was manager of Minnesota & Ontario Paper Co.'s Division of Forest Lands Development, in which capacity he supervised the firm's forest management program.

Mr. Low joined Mando in 1921 as an employee of the Canadian Division. He worked on the surveys for the Seine River Power Development and the construction of transmission lines. He was later mill engineer at Fort Frances.

Milton A. Engerson, 47, purchasing agent for St. Regis Paper Co., died December 11 in a Tacoma hospital. He was a native of Kaukauna, Wis., and had lived in Tacoma for 25 years. He had been employed by St. Regis since 1930.

John C. Van Cleaf, 65, a former executive of Gaylord Container Corp., Jersey City, N. J., died suddenly January 4 at his home in Madison N. J. He entered the corrugated paper business upon graduation from college, working first for Thompson Norris Co. in Brooklyn. He joined Gaylord 20 years ago and became assistant general Eastern manager. He designed corrugated boxes, some of his designs being patented. Mr. Van Cleaf retired two years ago.

George C. Ehemann, Jr., 43, manager of the maintenance division of Ohio Boxboard Co., Rittman, Ohio, died in Memphis, Tenn., December 25.

George Dahlstrand, 51, former cruiser, scaler and wood buyer for Rhinelander Paper Co., died at Rhinelander, Wis., December 15.

Frank E. Kenney, 64, plant superintendent for Ontario Paper Co. Ltd., Thorold, died December 30.

Karl Voss of Franklin Lakes, N. J., founder and president of Karl Voss Corp., Hoboken, N. J., manufacturer of paper boxes for the cosmetics industry, died January 1.

Philip C. Powers, 84, president of Powers Paper Co., paper converters, died January 8 at his home in Springfield, Mass. Mr. Powers was with the Connecticut River Pulp & Paper Co. until 1889, when he joined Powers, of which the former company was an affiliate. He became president of Powers in 1941.

Fisk Demerest Hallidy, 52, of Ridgewood, N. J., general traffic manager of Flintkote Co., died of a heart attack December 16 in Chicago while on an extended business trip. He joined the company at Rutherford in 1927 and became traffic manager in 1934.

William N. Stetson, Jr., president and treasurer of Storrs & Bement Co., Boston, from 1929 until February, 1953, died suddenly December 19. His first business connection was with American Optical Co., Southbridge, Mass. Following this he joined the old Bay State Paper Co., where he rose to be star salesman and continued with the firm after it was bought out by Whitaker Paper Co., Cincinnati, Ohio. He joined Storrs & Bement as a salesman in 1919.

Herman M. Gumbin, 58, president of Rockford Paper Mills Inc. of Rockford, Mich., died January 3 in Miami Beach, Fla.

The Paper Industry Patent Reviews

MELVIN NORD*

Recovery of Chemicals from Smelts Obtained in Pulping Operations

U.S. 2,656,245, issued Oct. 20, 1953, to Kenneth R. Gray and Hartzell L. Crosby, assigned to Rayonier Inc., provides an ion exchange process for converting sodium sulfide smelt from the combustion of waste liquor into forms suitable for the preparation of alkaline digestion liquors in a two-stage pulping process.

Fig. 1

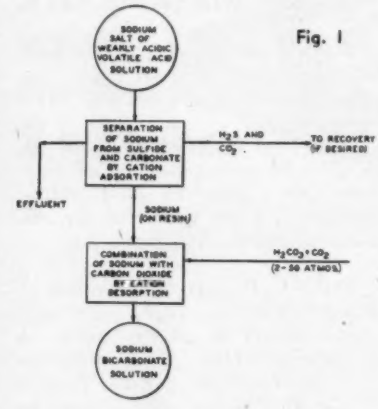
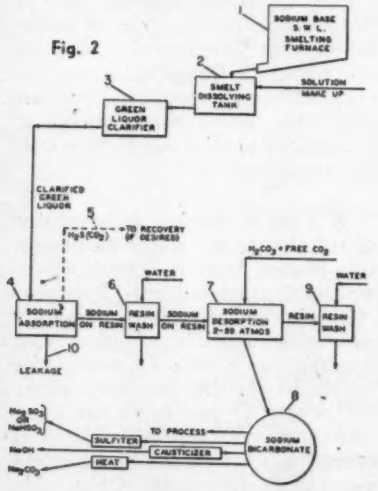

SODIUM SALT OF WEAKLY ACIDIC VOLATILE ACID SOLUTION
SEPARATION OF SODIUM FROM SULFIDE AND CARBONATE BY CATION ADSORPTION
H_2S AND CO_2
TO RECOVERY (IF DESIRED)
EFFLUENT
SODIUM (ON RESIN)
COMBINATION OF SODIUM WITH CARBON DIOXIDE BY CATION DESORPTION
$H_2CO_3 + CO_2$
(2-30 ATMOS.)
SODIUM BICARBONATE SOLUTION

Fig. 2



The flowsheets, Figs. 1 and 2, show the principle of the process and the method of applying it in the recovery and production of chemicals used in the making of wood pulp.

In general, the process involves treating at 60 to 90°C. a sodium sulfide and carbonate solution with a cation exchange resin having active exchange centers which are due to phenolic hydroxyl groups or carboxylic acid groups in hydrogen form. Methods of preparing the resins are described in the patent. A commercially available resin, "Amberlite IRC-50," can also be used. The alkali metal is adsorbed on the resin and the weak acid (H_2S and/or CO_2) is liberated in gaseous form. The liquid effluent is discarded. The resin with its contained alkali metal may be washed and is then treated with carbonic acid under pressure (2-50 atm.). This regenerates the resin and causes the formation of alkali metal bicarbonate.

In Fig. 2 is illustrated the treatment of combined waste liquor, recovered as an effluent from the successive acid sulfite and alkaline digestion of wood, which is concentrated to at least 50 per cent total solids content in conventional multiple-effect evaporators and fired in a smelting type recovery furnace (1). When operated under reducing conditions in the smelting zone, the furnace will generate steam and yield a smelt of fused soda salts. This smelt flows from the furnace and may be quenched or dissolved (2) in water or some suitable effluent solution from the process to yield a characteristic "green liquor" containing essentially sodium sulfide with smaller amounts of sodium carbonate, sodium sulfate, and sodium thiosulfate. Following clarification (3), part or all of the green liquor is diverted to the ion exchange plant for the production of sodium salts of carbonic acid.

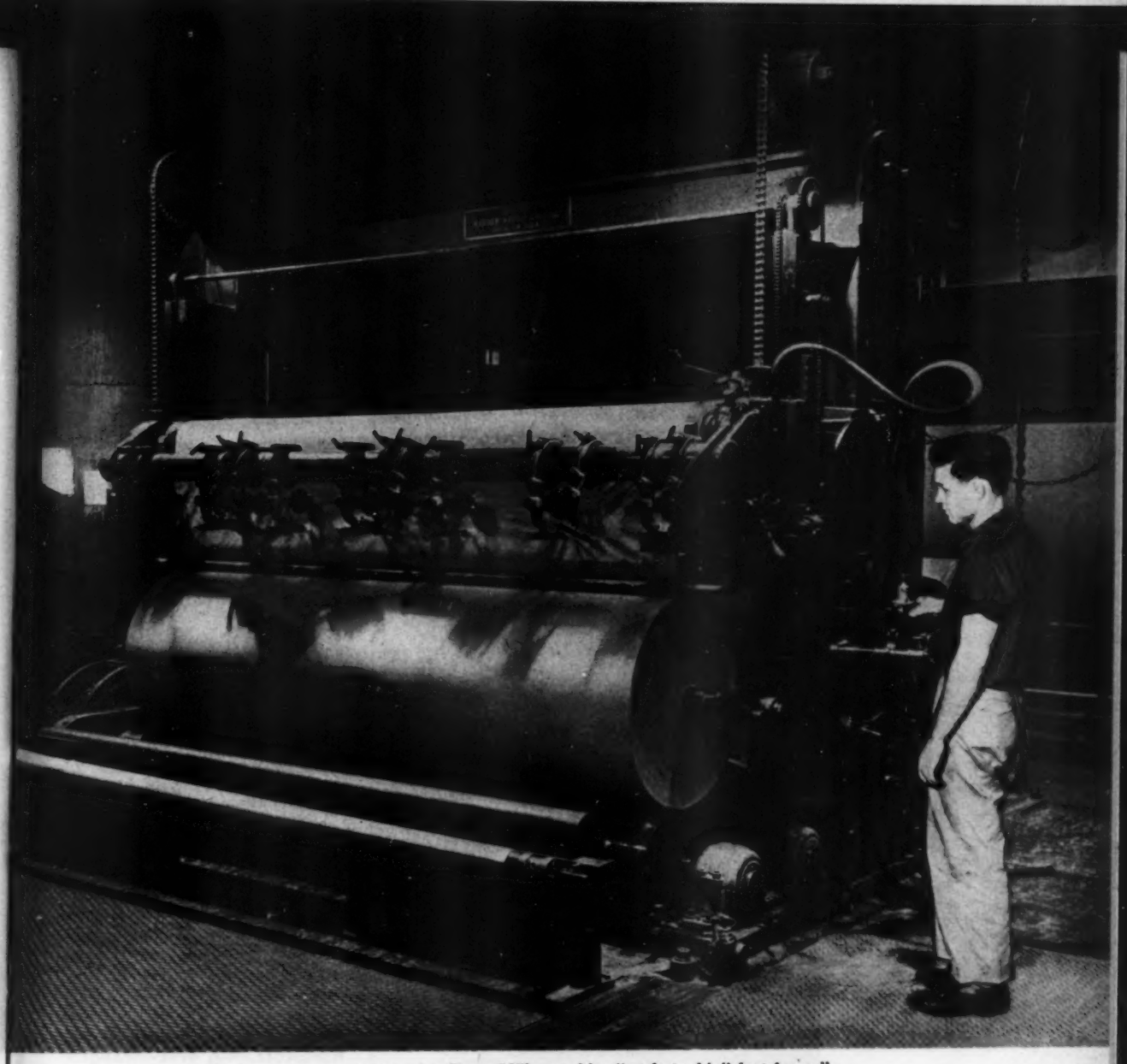
The smelt solution is then contacted with the ion exchange resin, preferably at a high solution concentration (100 grams equivalent Na_2O per liter). Since adsorption of the soda (4) is accompanied by the spontaneous evolution of the corresponding free acids, H_2S and H_2CO_3 (5), the reaction may conveniently be carried out 60 to 90°C., which is approximately the temperature of the green liquor from the clarifier.

The resin containing the adsorbed sodium is washed by displacement (6) to remove excess smelt solution. The washed resin is then treated with an excess of carbonic acid solution under CO_2 pressure, which effects regeneration of the resin and

*Patent Attorney, 664 Putnam, Detroit, Mich.

Other Patents of Interest to The Paper Industry

Subject	*Inventor or Assignee*	*Patent No.*	*Date*
Method and machine for forming linings of stretchable paper	Arkell Safety Bag Co.	2,655,080	10/13/53
Carton setup machine	General Package Corp.	2,655,081	"
Breaker for the scores of tubular cartons	International Paper Box Machine Co.	2,655,082	"
Sheet stacking and delivering machine	American Boxboard Co.	2,655,272	"
Pulpwood boxcar unloader	Caney A. Thompson	2,655,275	"
Box construction	St. Regis Paper Co.	2,655,283	"
Molded pulp carton	General Package Corp.	2,655,303	"
Collapsible carton	Bloomer Bros. Co.	2,655,304	"
Egg carton	General Package Corp.	2,655,305	"
Apparatus for defibrating waste paper from paper mills	Karl A. Skardal and Olov B. Borjeson	2,655,840	10/20/53
Mechanism for freeing flaps and cutouts in carton blanks	Gardner Board and Carton Co.	2,655,841	"
Blank forming apparatus	John R. Baumgartner	2,655,842	"
Folding box machine	Bemiss-Jason Machine Co.	2,655,843	"
Box blank forming machine	Hoague-Sprague Corp.	2,655,844	"
Box holding clamp	International Paper Co.	2,655,962	"
Bag of open-mesh material and paper	Bemis Bro. Bag Co.	2,655,969	"
Carton construction	The Ohio Boxboard Co.	2,656,092	"
Refining blender	Gruendler Crusher & Pulverizer Co.	2,656,119	"
Recovery of chemicals from smelts obtained in pulping operations	Rayonier Inc.	2,656,244	"
Preparation of sodium bisulfite solution	Rayonier Inc.	2,656,249	"
Production of non-gloss paper-board for gloss ink printing	Consolidated Power & Paper Co.	2,656,286	"
Resilient packing pad	Spangh Paper Co.	2,656,291	"
Pulpwood saw grinder	Robert L. Tomlin	2,656,738	10/27/53
Carrier	Dacam Corp.	2,656,959	"
Can carrier	National Folding Box Co., Inc.	2,656,960	"
Apparatus for handling corrugated paperboard	Seabord Container Corp.	2,657,044	"
Discharge device for finely divided fibrous material from a pressure system	American Defibrator, Inc.	2,657,131	"
Mechanical device for classifying logs	Gunnar G. Edstrom	2,657,785	11/3/53
Closure top	Jesse Norden	2,657,848	"
Shipping container	The Patent & Licensing Corp.	2,657,849	"
Collapsible box	Fort Orange Paper Co.	2,657,851	"



Kidder Senior Superspeed Winder in a Paper Mill — making "ready to ship" dust-free rolls.

You need all 3 in a modern mill winder

1. *High Production* — Designed for continuous duty, high-speed operation, with a minimum of down time.
2. *Shear Cutting* — Kidder has always employed the shear-cut method for accurate, long life, dust-free slitting, assuring positive roll separation.
3. *Low Maintenance* — Gearless design — ample capacity antifriction bearings — dynamic balancing — long-life shear slitters — all contribute to low maintenance and uninterrupted operation.

Since W. P. Kidder built his first Slitter and Winder in the 1890's, a continuous program of engineering development has kept Kidder ahead of the field. Kidder was the first to offer gearless drives, pneumatic counterbalance of the rider roll, and among the first to offer all-electric tension control and electric eye side guiding.

For leaflet giving details of these modern Slitters and Winders, write to the Kidder Press Company, Dover, N. H.

Kidder

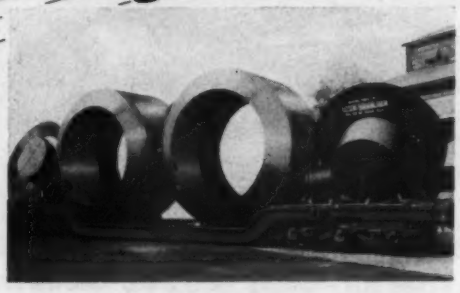
3 POINT SLITTERS

High Speed Cutting
Dust-Free Operation
Easy Roll Separation

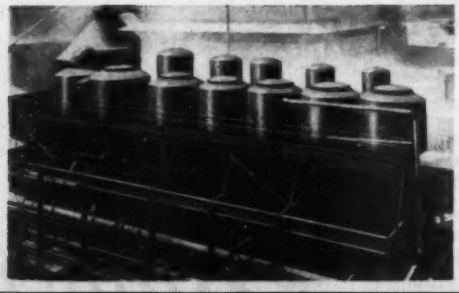
Going

Going

Gone!!



but NOT FORGOTTEN!



Tested and started with Goslin-Birmingham cooperation and assured of our continuous inspection and interest.

GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
BIRMINGHAM, ALABAMA
CHICAGO: F. M. deBeers and Associates, 20 N. Wacker

desorption of the sodium (7) to form an effluent containing sodium bicarbonate and free carbonic acid (8). The excess carbonic acid may be readily removed by heating to give bicarbonate which may be decomposed to give normal carbonate if desired.

Subjecting the resin to a brief wash to remove residual carbonic acid (9) completes the cycle and leaves the resin ready for reuse.

The use to which the sodium carbonate or bicarbonate product is put will depend somewhat on the particular pulping process used. It may be used as such for alkaline cooking liquor make-up, converted to caustic soda by causticization, or treated with sulfur dioxide to produce sodium sulfite for use in alkaline cooking or refining.

An important application of the ion exchange treatment is as a means of reducing the sulfidity of black liquor from a kraft cook.

Further details of the process are also given in U.S. 2,656,244 and 2,656,249.

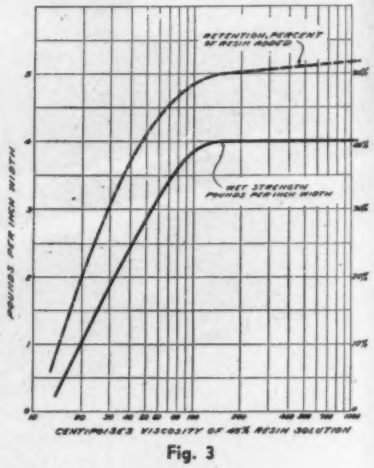

RETENTION, PERCENT OF RESIN ADDED
WET STRENGTH POUNDS PER INCH WIDTH
POUNDS PER INCH WIDTH
CENTIPOISES VISCOSITY OF 40% RESIN SOLUTION

Fig. 3

Manufacturing Wet-Strength Paper

In U.S. 2,657,132, issued Oct. 27, 1953, to John H. Daniel Jr., Chester G. Landes, and Tzing Jiueq Suen, and assigned to American Cyanamid Co., the manufacture of wet-strength paper containing cationic urea-formaldehyde resin is described.

It has been found that resins of this type are selectively absorbed by the cellulose fibers from a dilute aqueous solution or dispersion. This makes it possible to apply to cellulosic fibers sufficient quantities of the resin while the fibers are in dilute aqueous suspensions of the consistency used in paper mills (generally 0.1 to 6 per cent). The preferred method of application of the resin is by adding it in its uncured, water-dilutable condition to an aqueous suspension of the paper stock. Methods of preparing the resins are described in the patent.

Fig. 3 is a graph showing the increase in retention of the resin with an increase of viscosity of the resin syrup up to about 100 centipoises, with a corresponding increase in the wet strength of the paper.

Foreign Abstracts

Moisture control by means of the "Schie-Straatveit" system

After describing the uncertainty of manual controls in paper drying, the author discusses in some detail "impulses" used in measuring, and automatically controlling the moisture content of the paper in its passage through the machine.

The impulse applied in the Schie and Straatveit system, which serves to measure and control moisture in the moving sheet, is described in detail, with the help of suitable diagrams and graphs. The claim is made that the impulse is a rigorous function of the moisture content of the sheet. The structure of the impulse units, the instrumentation and the means of registering in his system are fully described. The impulse equipment in place, contacting a lower drying cylinder, is shown in the accompanying figure.

The importance of satisfactory operation at the dry-end of the paper machine and its effect on paper quality are also discussed, together with studies on the hygroscopic properties of paper. Apparently the system can record the moisture content both in the machine and cross directions and can serve to keep the moisture of the moving sheet automatically at a constant level. Seventeen illustrations. Arne J. Schie. *Norsk Skogindustri*, 7, No. 11, 389-404 (1953). (Original in Norwegian, with a brief English summary.)

Willow pulp

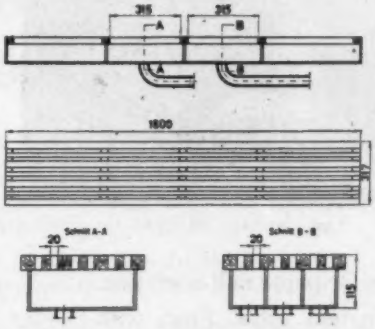
Five species of willow wood are investigated. In many respects they resemble aspen wood and, like the latter, appreciable amounts of tension wood. However, certain zones in the willow wood contain starch which has to be removed (by diastase) before the tension wood can be tested for by the usual staining reaction. The starch content increases with the height of the tree.

Willow is more difficult to pulp (by the kraft process) than is aspen, and higher digestion temperatures are required. The willow pulp yields range from 47-60 per cent, and the yields increase with increasing tension wood content and with increasing age of the tree. Evidently, the tension wood is high in polysaccharides. The strength properties of the willow wood pulp are satisfactory. G. Jayme, M. Harders-Steinhaüser, and W. Mohrberg. *Holz Roh- u. Werkstoff*, 11, 276-83 (1953) (in German) (through *C.A.*, 47, 11727).

Water drainage and air-flow through suction boxes

This is a communication from the Central Laboratory of the Swedish Paper Mills in Stockholm, where their experimental paper machine is used to determine the influence of certain factors as the paper web passes over suction boxes and the suction couch.

A special suction box (see accompanying figure) is constructed and divided into several compartments, each of which is provided with water separators and measuring devices for the exhaust air. The length of this box can be varied, and over it runs an endless plastic cloth, simultaneously with the wet paper web. This equipment furnishes the means of varying suction time, vacuum, and air quantities, all independently of each other. When the dry content of the sheet is raised from 6.5-8.5 per cent up to about 12 per cent at the suction boxes (using an unbleached sulfite pulp [50 g. per sq. m.]), the air pulled through the sheet approximates 3 l. per sq. m. when the stock has been beaten to 55° Schopper-Riegler (S-R) and about 11 l. per sq. m. at 30° S-R. Most of the dewatering occurs immediately after the front wall of the suction box has been passed.



With regard to the suction couch, the dry content of the sheet increases with the vacuum and the air quantity, until 50-70 l. per sq. m. of paper surface (at atmospheric pressure and 15°C.) have been reached. The suction time does not seriously affect the dry content of the sheet. Eleven figures. O. Brauns and R. Oskarsson. *Svensk Papperstidning*, 56, No. 18, 691-696 (1953). (In Swedish, with an English summary.)

Acetate pulps from cereal straws

This is an extension of previous work. The influence of silica content on cellulose acetate formation is studied.

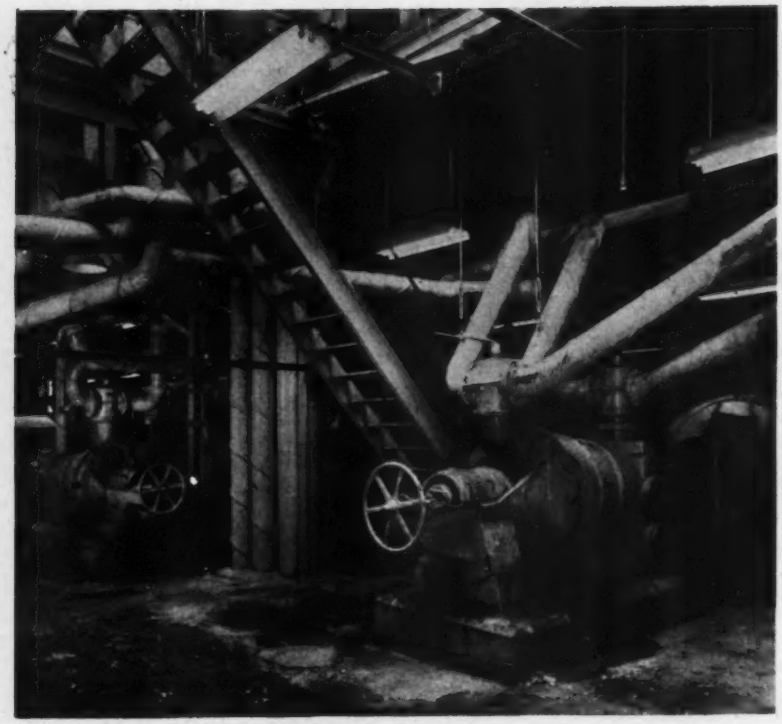
The crude wheat straw which contains stems with nodes and a certain percentage of spikes and leaves, is fractionated carefully so that the authors can obtain samples not only of crude wheat straw, but of the node-containing stems, the separated nodes, stems *free* from nodes, leaves and spikes. Each of these portions is studied with regard to per cent weight (computed on crude wheat straw), per cent ash, per cent silica and especially the per cent alkali-insoluble silica.

Each of the samples is prehydrolyzed and then given a kraft cook and a multiple stage bleach (which requires seven to nine stages). The highest ash content is found in leaves and spikes, and these fractions also contain the highest silica content. Leaves contain 1.14 per cent alkali-insoluble silica, representing about 72 per cent of that found in the crude wheat straw, which contains only 0.47 per cent alkali-insoluble silica and about 30 per cent of the leafy fraction.

Bleached and unbleached pulps from crude wheat straw, node-containing stems, stems *free* from nodes, leaves and spikes are examined for yield, alpha cellulose, furfural, degree of polymerization, per cent of ash, and brightness; and similar data are obtained for bleached pulp from the separated nodes.

In all cases, the so-called "final turbidity values" [cf. Jayme and Schenck, *Cellulosechemie*, 22, 54, (1944)] are also determined in the bleached pulps, and these are correlated with the per cent alkali-insoluble silica in the original fibrous raw materials. Due to poor brightness, low yields, and to the relatively high silica retentions in pulp from leaves, this proves completely unsuited to cellulose acetate formation. Spikes also are shown to be rather unsatisfactory for the preparation of acetate pulp. The original leaves and spikes show a greater number of epidermal cells and fiber bundles carrying silica than do the other portions of the straw, which is in harmony with the higher turbidity values of the corresponding pulps. The node-con-

ARTERIES FOR PAPER MILLS



To provide dependable life-lines for paper mill operation, Naylor serves the industry in two ways. *First*, with extra-strong, easy-to-handle light-weight pipe. *Second*, with Naylor fabrication service that can provide special fabrications and fittings—no matter how intricate—to meet the exact specifications of your piping layout.

Write for Bulletin No. 507 on piping and Bulletin No. 525 on fabrications.

NAYLOR PIPE

Naylor Pipe Company • 1233 East 92nd Street, Chicago 19, Illinois
Eastern U.S. and Foreign Sales Office: 350 Madison Avenue, New York 17, New York

taining stems, separated nodes, and stems *free* from nodes all give pulps satisfactory for acetate preparation. Thus, when leaves and spikes are removed from crude wheat straw, this too yields satisfactory acetate pulp, without further cold alkaline purification; and the clarity of such acetate solutions approaches that of the acetates from cotton linters.

The authors include a certain amount of analytical data on other wheat straws and on a rye straw. Georg Jayme and Ludwig Scheuring. *Das Papier*, 7, 298-305; 347-51 (1953) (in German).

Corrosion in kraft digesters

In 1951 a Sulfate Digester Corrosion Committee sponsored by the Swedish kraft industry was appointed at Central Laboratory for the Cellulose Industry. This is an interim report concerned mainly with the corrosive action of various components of the white liquor and with the effect of composition of steels used in digester construction. The data apply to seven mills, and following is a summary of the results.

The composition of the white liquor has a definite effect on corrosion, which increases with increasing amounts of Na_2S, NaOH, $Na_2S_2O_3$, and Na_2S_n. Within the usual limits of the concentration of Na_2S and NaOH used in the white liquor, the corrosion rate is only very slightly affected by these components. It is possible to decrease or to stop corrosion by means of inhibitors; but, to date, those which were studied were found to be too expensive. With higher carbon and silicon content of the steel, corrosion seems to increase. The various welding materials investigated show differences in resistance to corrosion; those with a low silicon content seem to be the more resistant.

Six figures, eight tables and eight references are given. Lennart Ruus and Lennart Stockman. *Svensk Papperstidning*, 56, No. 22, 857-865 (1953). (Original in Swedish, with an English summary.)

Groundwood pulp from poplar in an experimental mill

Two species of poplar *(Populus robusta* and *marilandica)* in the form of small blocks (14.4 x 11.4 x 25 cm.) and spruce are ground under similar conditions in an experimental groundwood mill. The poplar, which has a naturally higher moisture content, can be ground more easily than the spruce. The stock from the poplar drains well and retains many well-preserved fibers, but high screenings.

The finest fraction from the poplar is largely wood flour, not mucilage like that obtained from spruce groundwood. The poplar mechanical pulp sheets thus show lower strength properties than those of similarly prepared spruce groundwood sheets. The sheets from poplar have relatively low density, are soft and have a high absorptivity; their brightness is inferior to that of the spruce sheets. Even under increased grinding, poplar fails to give a strong sheet. Improvement in strength may be obtained by blending with spruce groundwood or slightly beaten sulfite pulp. Walter Brecht. *Holz, Roh- u. Werkstoff*, 11, 293-6 (1953) (through Bull. I.P.C., 24, 130-131) (original in German).

MIDVALE *Forged* STEEL ROLLS

DO YOU NEED A *Better* CALENDER ROLL?

DO YOU KNOW that forged rolls as large as this—48" x 228" face—are used in modern super calenders for lower operating costs?

DO YOU KNOW that we can forge rolls like this from our own high-grade alloy steel and harden them to over 90 scleroscope?

DO YOU KNOW that Midvale forged calender rolls will take a better finish and produce higher quality paper at less cost in the long run?

DO YOU KNOW that Midvale has scores of years of experience and "know-how" in making fine calender rolls?

DO YOU KNOW about the savings you can realize with Midvale Stainless Steel water-box rolls?

Why not consult us about your calender roll problems? Send for descriptive folder on hardened and ground paper mill rolls.

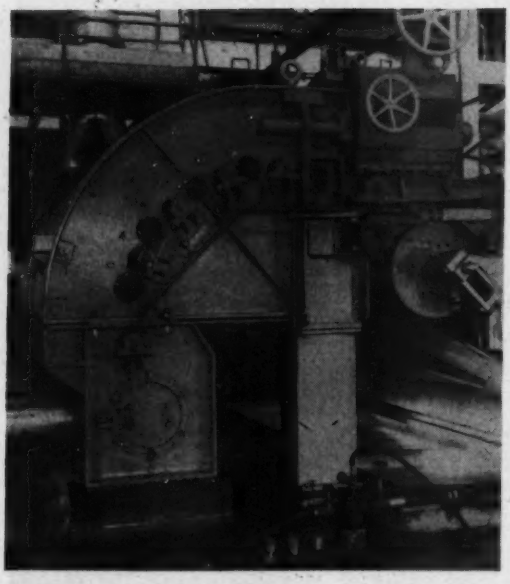
THE MIDVALE COMPANY- Nicetown, Philadelphia 40, Pa.

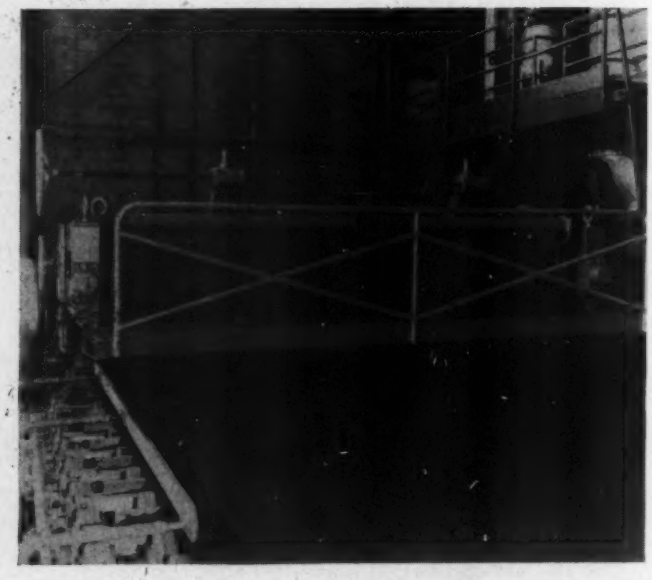
Offices: New York, Chicago, Pittsburgh, Washington, Cleveland, San Francisco

MIDVALE

FORGINGS, ROLLS, RINGS, FLANGES, STAINLESS STEEL CASTINGS

The Paper Industry New Products





Pressure primary headbox

A new pressure primary headbox operates on the principle of full hydraulic pressure. This pressure is created by the fan pump located in the basement of a mill, drawing its white water from the wire pit and the stuff from the regulating stuff box. The flow from the fan pump is then directed through a valve and, hence, through the stainless steel manifold into the receiving chamber of the headbox itself. The stock then moves through a closed conduit containing a number of distributing rolls of graduated design through the throat of the inlet containing a larger distributing roll.

The entire inside portion of the box is stainless lined and the distributing rolls are all of stainless steel. The upper nozzle blade and the apron blade forming the discharge orifice of the inlet are completely adjustable while the machine is in operation.

In normal headbox operation, the pressure which is converted to velocity at the orifice is controlled by the opening of the nozzle blade. In one specific installation, the pressure head under which this unit operates is controlled by a unique application of a differential pressure instrument. *Valley Iron Works Co., Appleton, Wis.*

Redesigned recording spectrophotometer

A redesigned recording spectrophotometer for industrial use in setting up standards to control the color of paints, dyes, glass, textiles and other materials has been announced.

Long used in laboratories for chemical, medical, and pharmaceutical analysis, the GE device was re-engineered with emphasis on accurate color measurement, greater sensitivity, and faster operation to increase applicability.

According to company engineers, the instrument now furnishes a rapid color analysis by drawing a complete didymium curve in 54 seconds with photometric accuracy of 0.5 per cent, wave length accuracy within 1.0 millimicron, and photometric precision within 0.2 per cent.

A range of 380 to 700 millimicrons has been provided in anticipation of any new colorimetric standards which may be established by the International Commission of Illumination.

The recording spectrophotometer has been simplified so that a semi-skilled person now can operate the equipment with relatively little instruction. Routine operation is largely automatic.

A new feature in the redesigned GE equipment eliminates the need for an opal glass plate formerly used to diffuse light over the photo-tube. By using a small lucite cylinder, light is passed directly to the photo-tube thereby increasing the total light available. A new electronic system, mounted on a single chassis, eliminates the need for thyratron tubes. *Special Products Section, General Electric Co., Schenectady 5, N.Y.*

Flywheel motor generator sets

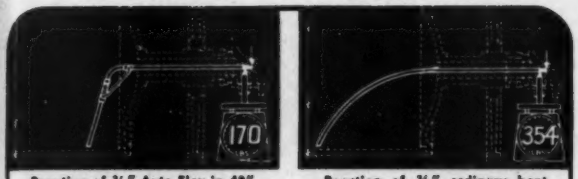
Production of flywheel motor generator sets for microwave system power supply has been announced. These flywheel generator sets and associated emergency transfer control are said to insure continuity of power supply for microwave equipment used for protective relaying, supervisory control, and communication on utility, pipe line, and similar long distance systems. *Electric Machinery Mfg. Co., Minneapolis 13, Minn.*

Thermocouple protection tube

A new fast response thermocouple Speedwell protection tube eliminates junction boxes, prevents "breathing" of corrosive gases or liquids into well, holds thermocouple in place, and provides fast interchangeability for checking and replacing thermocouples, according to the manufacturer.

The small diameter thermocouple tube with subsequent low mass is said to provide greater accuracy and faster response. The entire thermocouple protection tube is made of stainless steel to resist corrosion both inside and outside. Neoprene is the standard sealant. Teflon or Asbestos Graphite are also available as sealants. The end fitting locks and seals 20 gauge or 24 gauge insulated duplex thermocouple in the well. The seal is effected by compressing the neoprene washer around the wires.

The thermocouple protection tube is supplied with a stainless steel adjustable midlock tube fitting for sealing and adjusting immersion of the protection tube into the vessel. *Conax Corp., 4515 Main St., Buffalo 21, N.Y.*

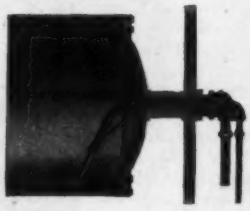


Reaction of ¾" Auto-Flex in 48" dia. dryer. Very low leverage.

Reaction of ¾" ordinary bent pipe. Syphon in 48" dia. dryer. High leverage.

THIS SYPHON HOLDS ITS POSITION AND SERVES INDEFINITELY

Midwest Auto-Flex syphons have been on the market for years and many thousands are in service for two very excellent reasons — they hold their position — they wear indefinitely.



1. The spring and brace holds the end of the pipe at the proper distance from the bottom of the dryer. It cannot take any other position—hence, proper water and air removal.

2. The cantilever leverage exerted is lower than with bent pipe syphons, only 170# vs 354#. It clears instead of dragging on the journal and rapidly wearing out.

Order a get acquainted dozen. Performance guaranteed.

MIDWEST · FULTON MACHINE COMPANY
DAYTON, OHIO

Kalamazoo GLAZED TILE TANKS AND CHESTS...

Engineered to your needs ... any size or shape ... impervious to corrosion ... keep contents clean ... reduce friction of flowing liquids ... easiest to clean ... last for years and years.

SEND FOR COMPLETE DETAILS

Kalamazoo TANK and SILO CO.
TILE TANK DIVISION
HARRISON STREET ... KALAMAZOO, MICHIGAN

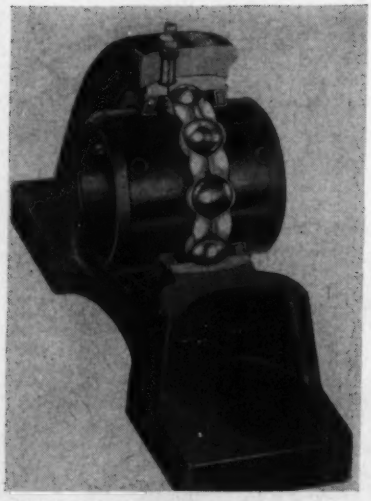
PERFORMING PRODUCTION MIRACLES...

Up production and cut down maintenance in your plant. Install rugged Fabri-Valves, made of stainless steel, monel, nickel alloy or any combination. Fabri-Valves are complete weldments of rolled plate, thus eliminating porous areas and assuring proper thickness. These light-wall valves are fabricated to give internal and external protection wherever required.

Alloy Fabri-Valves cost less, weigh less, are cheaper to ship and install. Fabri-Valves are designed to your specific requirements. They are especially recommended for use with light weight modern piping. 2" to 24" Fabri-Valves carried in stock. Custom made orders filled in 30 days. Contact your nearest agent.

FABRI-VALVE
TRADE MARK
COMPANY OF AMERICA
2100 N. Albina Avenue, Portland 12, Oregon

SOUTHERN CORPORATION.....Charleston, S.C.
FELKER BROS.....Marshfield, Wis.



Ball bearing pillow block

Zone hardened Sealmaster ball bearing units with double extended race are now being manufactured. Zone hardening is a patented process for induction heat treating the inner race ring of Sealmaster units through the ball path section only. Since the extended portions of the race remain unaffected, the hardened threads of the set screws are able to bind tightly against the soft threads of the race for positive race to shaft locking. The double extension of the inner race ring affords maximum support of bearing on shaft and guarantees a positive lock between the inner race of the bearing and the shaft, according to the manufacturer.

This positive lock is said to reduce shaft wear and fretting corrosion. It is also claimed that shock and vibration resistance are increased since most of the inner race remains relatively soft and tough. *Stephens-Adamson Mfg. Co., Aurora, Ill.*

Biocide

A new biocide, a material which is effective in killing slime causing bacteria, is now giving excellent slime control in paper mills, it is claimed. Known as Crag 974, it is marketed as a free-flowing dispersible powder that is readily dissolved in water.

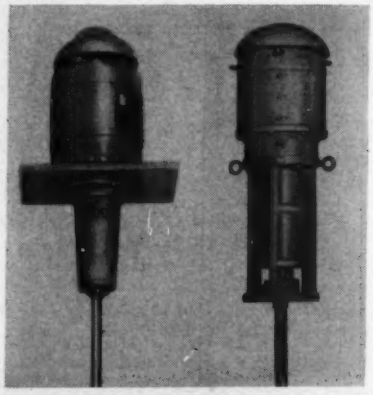
Paper mill experience has shown that continuous addition of this biocide at the head chest or beater is the most effective method of application. A large initial dose is employed, and the concentration decreased gradually until the best control level is reached. In this way, the bacteria count drops quickly and stays down to a minimum. *Carbide & Carbon Chemicals Co., Div. of Union Carbide & Carbon Corp., 30 East 42nd St., New York 17, N. Y.*

Wetting agent and penetrant

"Monawet Mo" is the sodium salt of the di-(2-ethylhexyl) sulfosucccinic acid, a compound known for its outstanding wetting and penetrating power. According to the manufacturer, this product has proved its usefulness wherever penetration, wetting-out or depression of surface tension are required, as in the preparation of dispersions and emulsions in the paper industry.

Although solutions containing this wetting agent will show substantial sudsing, the foam will subside rather quickly. The quantity, as well as the stability of the foam, can be improved or reduced according to requirements.

Monawet Mo is stable indefinitely in neutral, cold or hot water solutions. The stability is claimed to be very good in solutions within a pH range from 5 to 9. It is available in various forms and concentrations. *Mona Industries, Inc., 65-75 E. 23rd St., Paterson 4, N. J.*



Drives for mixing units

Labeled the Series 2400, for beam or channel mounting with open tanks, and the Series 3200, for flange mounting-sealed system operation, two new "Dispersator" drive units are designed to operate in the 30 to 300 gal. batch range. Construction features include flexible motor couplings, sealed-for-life bearings, and welded (or cast) support frames.

The driven shaft in the 2400 unit is readily demountable by loosening the chuck. The 3200 shaft is fixed, since alignment at a mechanical seal is often required. *Premier Mill Corp., Geneva, N. Y.*

Synthetic sizing agent

A new concept in synthetic sizing agents which makes it possible for the paper industry to manufacture papers previously considered impossible was recently announced. Cyron Size, the trade mark of this unique sizing agent, has shown outstanding results in both alkaline and acid stocks, according to the manufacturer, and is especially effective as a beater additive when water, high ink, acid, and alkali resistance specifications must be met.

This synthetic sizing material can be fixed in the paper under alkaline conditions. It is claimed that it not only eliminates the need for making paper under acid conditions and produces paper which is more durable and applicable to a wider range of uses, but reduces curl as well.

The new size, with which no rosin, wax or alum is required, may be applied to the surfaces of rosin sized papers for added effect. It is easily prepared for mill use by dissolving in hot water and adding the solution to the slush stock or to the surface of the paper. *Paper Chemicals Dept., American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y.*

HARD CHROME

That Will Not Peel or Blister

OUR PLANT
HAS THE FACILITIES TO HANDLE
PAPER MILL EQUIPMENT

Tanks: 21′ x 6′ x 6′
Electrical Capacity: 40,000 amps.

Ultra Plating Corporation
345 S. PEARL ST.
GREEN BAY, WISCONSIN

Consult this Booklet

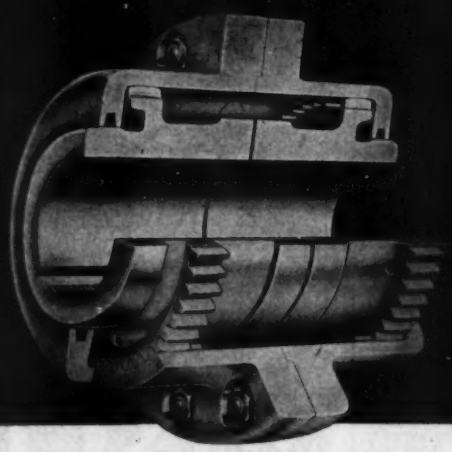
... for Precision Engineered Paper Processing Equipment

HUDSON-SHARP
MACHINE CO • GREEN BAY • WIS
Manufacturers of
Printers, Embossers, Folders, Interfolders, Waxers, Laminators, Wrapping Machines, Core Winders, Packaging Presses, Crepers, and Napkins, Toilet Tissue and Paper Towel Units.

Paper, film or foil—If your converting or processing problem is one of Printing, Embossing, Laminating, Waxing, Creping, Folding, Winding or Wrapping you'll find a Hudson Sharp machine especially designed for the job. Write today for this latest machinery brochure which briefly describes our complete line.

We are contributing to the nation's defense program by providing a large part of our increased production facilities for building precision armaments. Civilian orders are filled on a reasonable time basis only.

POOLE



A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

FLEXIBLE COUPLINGS

POOLE FOUNDRY & MACHINE COMPANY WOODBERRY, BALTIMORE, MD.

NEWCOMB-DETROIT

PIONEERS IN INDUSTRIAL VENTILATION

HEAT & AIR SYSTEMS

that cut cost and increase production in

PAPER MILLS

For Bulletins and Quotations, Write

NEWCOMB-DETROIT
5763 Russell St.
Detroit 11, Mich.

ESTABLISHED 1912
• DETROIT DIVISION
• GRAND RAPIDS DIVISION
• NEWCOMB INDUSTRIES, LTD., WINDSOR, ONTARIO

ENGLISH ECCO CLAYS TRADE MARK CLAYS

UNIFORM • SUPERIOR • DEPENDABLE

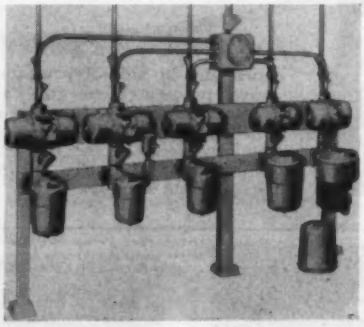
English China Clays Sales Corporation
551 Fifth Avenue, New York City

Storage shelters

A new development for yard storage is the "Yard-Stor" shelters, which are essentially a series of independent identical sections mounted on a track to form a building, providing permanent, temporary, or portable yard storage facilities.

The prefabricated sections are quickly erected to provide fast-handling storage facilities for all kinds of stores, machinery, equipment, materials, and finished products. They are designed and arranged to facilitate the use of cranes, fork lift trucks, straddle trucks, conventional trucks, trailers, etc.

The ribs and frame are constructed of trussed and bridged tubing and covered with corrugated metal, fibre glass or other material. In appearance, the building is not unlike popular conventional huts. The sections tilt, telescope, nest or slide apart and may be easily added to by simply extending the track. They are just as readily relocated. *Yard-Stor Shelter Co., 19256 John R, Detroit 3, Mich.*



Breaker-starter control equipment

A complete new line of explosion-proof, dust-tight, rain-tight circuit breaker, motor starter, and line starter combination enclosures has been announced. The enclosures, which are sold under the trade name "Unilets", carry U. L. Approval; and, with a new U. L. Approved sealing Unilet, may be joined in combination to meet U. L. requirements in certain sizes.

Each component Unilet for circuit breaker, motor starter, and seal possesses full seven-thread engagement at the coupling joints, as well as on the bolt-free covers. According to the manufacturer, absolutely safe entrance to individual motor starters for maintenance work is assured in both single and banked combinations in hazardous areas without shutting off other branch circuits. No "live" circuit breaker wires are exposed while the motor starter enclosure is open on a line starter combination.

Other features include: U. L. Approval on banked circuit breaker Unilets up to groups of three for Forms 1 and 2; lightweight construction; standardized mounting frames; simplified "straight-thru" wiring; versatile hub adaptors which permit use of over-size conduit and conductors, and streamlined push-button and pilot-duty control. *Appleton Electric Co.*, 1701-59 *Wellington Ave., Chicago* 13, *Ill.*

Electronic temperature controller

A new electronic temperature controller with increased range, from −100° F. to +600° F., has been introduced for industrial applications requiring precise and consistant temperature control but not requiring the functions of indicating or recording.

The new controller (called the New 077), which employs the resistance thermometer principle, is said to be unusually flexible in the type of control provided with a single-point model. The control adjustments are accessible for easy resetting. A pair of red and green signal lights is another feature of the new controller.

In addition to the single-point model, the new controller is also available in cascade control models utilizing two bulbs. The effect of the secondary bulb in this model may be changed relative to the primary one. Both the single-point model and the cascade model are available in three ranges: −20 to 220° F.; −20 300°F., and −100 to +600° F. Sensitivity for the first two ranges is ±0.1° F., and for the third range ±0.9° F. *Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves., Philadelphia* 44, *Pa.*

NOW READY

The completely revised, greatly extended

1954

PAPER MAKERS'
AND MERCHANTS'
DIRECTORY
OF ALL NATIONS

Contains summaries of nearly 3,000 Paper, Pulp & Board Mills in more than 50 countries, with Makes of Paper, Number and Widths of Machines, Tonnage Output, Power Used, Stations for Goods, Classified Lists of Products, etc.; British and Overseas Agents, Mill Representatives, Paper Merchants, Wholesale & Manufacturing Stationers and Equipment Suppliers; British Paper Stainers, Converters, Waste Paper Merchants, Rag Merchants & Paper Stock Dealers. Cardboard, Carton & Paper Box Manufacturers, Paper Bag Makers, China Clay Producers & Merchants. Also: Trade Associations, Tables of Weights & Sizes; Watermarks, Trade Customs and Buyers' Guide.

Supplies Limited: Order NOW

—advance orders have absorbed the greater part of the limited edition, and orders for the few remaining copies are being filled in rotation.

Fill in and Mail To-day
BUSINESS PUBLICATIONS LTD.
180 Fleet Street, London, E.C. 4, England

Please send us by return one copy of the 1954 PAPER MAKERS' & MERCHANTS' DIRECTORY OF ALL NATIONS, for which we enclose remittance for $6.50.

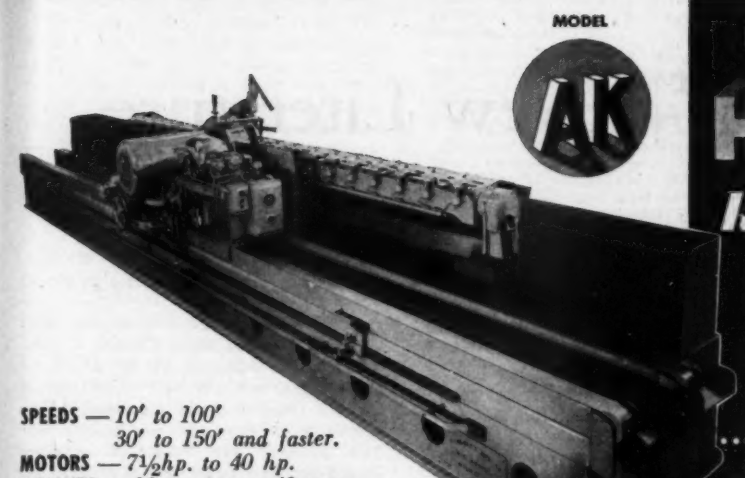
Name .....
Address .....
.....
..... PI

CARTHAGE
MACHINE CO.

Machinery for Ground Wood and Chemical Pulp Mills

CARTHAGE, NEW YORK

MISCO
STAINLESS STEEL CASTINGS
FOR ALL EQUIPMENT EXPOSED TO CORROSION BY SULPHITE ACIDS OR OTHER CORROSIVE AGENTS
MICHIGAN STEEL CASTING CO.
DETROIT 7, MICHIGAN



MODEL AK

FOR ACCURACY — FINEST FINISHES

HANCHETT

knife grinders

for the

PULP AND PAPER INDUSTRIES

FOR GRINDING — HOG — BARKER

PAPER TRIMMER AND DOCTOR BLADES

SPEEDS — *10′ to 100′*
30′ to 150′ and faster.
MOTORS — *7½hp. to 40 hp.*
WEIGHTS — *10 tons up to 40 tons.*
CAPACITY — *84″ to 360″ and longer.*
Mechanical or hydraulic head carriage drive for flat or concave bevel grinding.

Other Models.
GK — **medium heavy duty** — *capacity 32″ to 184″*
DK — **normal production** — *capacity 32″ to 108″*

NEW MODEL SK-24
slitter knife grinder
FOR TOP — BOTTOM SLITTERS
CAPACITY 3″ TO 24″ DIAMETER
SEMI OR FULL AUTOMATIC
FINEST IN ACCURACY AND FINISH

HANCHETT MANUFACTURING COMPANY
World's Largest Manufacturer of Knife Grinding and Saw Sharpening Machinery
MAIN OFFICE — Big Rapids, Michigan WEST COAST — Portland, Oregon

Automatic transmission

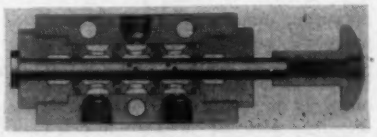
A new automatic transmission, known as the Hydratork drive, makes it possible to operate a gas-powered fork-lift truck with the same three simple controls used to operate an automobile: accelerator, brake pedal and forward-reverse selector lever located on the steering column. The design of the unit eliminates the need for a gear shift for high and low gears and clutch and clutch pedal.

One of the outstanding advantages of this drive, according to the manufacturer, is that it eliminates gear clashing during gear engagement, resulting in reduced maintenance requirement. Additional advantages over other transmissions are said to include smoother acceleration, more positive driver control at all times, quick, effortless changeover from forward to reverse motion and vice-versa, and controlled "inching" ability. *Clark Equipment Co., Battle Creek, Mich.*

Controlled volume pumps

These controlled volume pumps deliver exact quantities of a wide range of products, such as abrasive slurries, suspended solids, viscous and corrosive chemicals, regardless of change in discharge pressure, according to the manufacturer. In addition, they handle light solvents, liquefied gases, hot, cold and heavy liquids. Liquids can be delivered in quantities as low as 3 ml. per hour to as high as 50 gal. per minute against pressures to 20,000 psi.

The pumps are the reciprocating, positive displacement type, equipped with ¼, ½ or ¾ hp motors with speed reducers and an adjustable stroke plunger. Steel check balls at the pump end seat positively so that there is no loss of liquid with each stroke of the plunger. Multiple units, as well as single units, are available for various requirements. *CC Pump Mfg. Div., Market-Madison Sts., Palmyra, N.J.*



Air & hydraulic control valves

A new interior construction for control valves that simplifies the valve and provides positive positioning of the sealing packers without placing any mechanical pressure on the packers themselves has been designed.

The accompanying cutaway view shows the principal parts, which consist of a housing with straight through bore, gland nuts for the ends, a hollow, radially ported ground and polished stainless steel plunger, internal spacers that are held firmly in metal-to-metal end abutment, and two sizes of "O" rings.

According to the manufacturer, this construction minimizes friction; wear is practically eliminated; there are no lapped joints and no metal-to-metal seating; all parts are in pressure balance avoiding any tendency to creep or crawl, and maintenance is low. *C. B. Hunt & Son, Inc., Salem, Ohio.*

New Products Briefs . . . .

ADHESIVE—The 128-33 adhesive series has been announced. The "-33" types are specifically adaptable to exterior, fully waterproof bonding by room, intermediate temperature or high frequency curing methods. Advantages cited over earlier 128 types are: increased storage life, longer pot life, faster cures, lower spreads, less hardener required, and gluing costs lowered. *Snyder Chemical Corp., Bethel, Conn.*

PROTECTIVE COATING—"Nerva-Kote Tae" coatings offer a new type of versatile protection for metallic and non-metallic surfaces. They are room temperature cured, "baked" coatings, which offer the same resistance to alkalies, acids and solvents heretofore only available in baked-on systems, without the necessity of being baked. The coating is said to show excellent impact, abrasion and weathering properties, as well as good cold check qualities and chemical resistance. *Nerva-Kote Div., Rubber & Plastics Compound Co., Inc., 30 Rockefeller Plaza, New York 20, N.Y.*

DEFLOCCULATING AGENT—Results of recent research, coupled with the successful case history of the use of sodium tripolyphosphate in the manufacture of cement, seem to indicate an entire new, diversified future for this chemical as a deflocculating agent, where the addition of small quantities of it permits reduction in water content while still maintaining pumpability or workability. *Phosphate Div., Monsanto Chemical Co., St. Louis 4, Mo.*

The Paper Industry New Literature

Books

ORGANIC PROTECTIVE COATINGS. Edited by William Von Fischer and Edward G. Bobalek. Published by Reinhold, Publishing Corp., 330 West 42nd St., New York 36, N. Y. 6¼ x 9¼. 387 pages. $7.50.

Emphasizing specifically the problems of formulation, specification and application of organic coatings, this new book describes the fundamental theory and practice of paint as an engineering material.

Several chapters present the theories of physics and chemistry as applied to coatings technology. Others offer typical case histories of progress in the coatings industry, such as the development of anticorrosive and luminescent pigments, aminoplast resins, hot spray lacquers, emulsion and latex paints; the protection of metal surfaces with synthetic resin coatings; new applications of organic coatings to electrical insulation, and the use of silicone resins in heat-resistant paints.

Full consideration is given to the practical economic factors involved in selecting the proper coating for any specific application.

MECHANICAL PROPERTIES OF WOOD AND PAPER. Edited by R. Meredith. Published by North-Holland Publishing Co., Amsterdam, The Netherlands. Distributed by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N.Y. 6 x 9. 300 pages. $7.25.

This book, one of a series of monographs on the rheological behavior of natural and synthetic products, is divided into two parts. The first part on the mechanical properties of wood and their relation to moisture is written by Dr. W. W. Barkas, reader in paper-making technology at the University of Manchester, with a chapter on elastic and plastic properties of natural wood by R. F. S. Hearmon, officer in charge, Physics Section, Forest Products Research Laboratory, Princes Risborough, Bucks. An account of the more fundamental work on the rheology of wood is given, with special emphasis on the thermo-dynamic aspects of the relations between the hygroscopic and the rheological properties of swelling materials. An introductory chapter to this section gives a description of the growth and structure of wood.

The second part, covering the mechanical properties of paper, by Dr. H. F. Rance, director of research at Wiggins Teape Group Research Organization, Woodburn Green, Bucks, England, is written for two types of reader: the scientific investigator of the mechanical properties of materials and the person who is more directly concerned with the making and using of paper. An introductory chapter on the papermaking process is included in this section. The range of topics in paper rheology covered by Dr. Rance includes, among many other subjects, a discussion of testing instruments from the viewpoint of the rheologist.

Also included in this volume are 88 illustrations.

PUMPS. Second Edition. By Frank A. Kristal and F. A. Annett. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N.Y. 6¼ x 9¼. 380 pages. $6.50.

This book covers pumps of many types and all designs, explaining what kinds are available, how to select and install them, how to operate and maintain them, and how to locate and remedy pump troubles. A wide range of pump applications are discussed, including boiler feed, paper stock, deep well, sewage and sludge, chemical, food product, oil field, gasoline line, fire, corrosive, mine, etc.

The performance features of the various types of pumps are explained, as well as their service limitations. Also described are construction features, materials used in manufacture, and essential details about the operation of particular types. In addition, this book offers help in stating pump requirements to manufacturers and suggests practical methods for figuring the head, economical pipe sizes, various pump combinations, etc.

This revised edition covers new designs, materials and applications developed since the first edition, including the latest technical advances in diaphragm, variable-displacement, proportioning, self-priming, regenerative turbine, rotary, jet and many other types of pumps. New designs developed to combat impeller clogging in the operation of sewage and sludge pumps are included. Material is also included on mechanical seals, now widely used to seal pump shafts against leakage.

Booklets and Pamphlets

GROWING TREES IN A FREE COUNTRY. Published by Forest Industries Council. Copies available from American Paper and Pulp Association, 122 East 42nd St., New York 17, N. Y. 6 x 9. 22 pages. Page one of this booklet condenses the Forest Industries Council's view in connection with a long range forestry management program in the United States. The remainder of the booklet explains how and why these beliefs were adopted.

HOW'S YOUR PAPER KNOW-HOW? Published by M. J. and W. B. Wheelwright, 14 Hurlbut St., Cambridge, Mass. 8½ x 11. 20 pages. 25 cents. A quiz on paper, this pamphlet is a supplement to Wheelwright's *Practical Paper Technology*. The 144 questions contained in this pamphlet are keyed, chapter by chapter, to the textbook where answers can quickly be found.

WORKING TOGETHER FOR SAFETY. Published by National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. 4 x 7. 32 pages. This new employee rules manual contains instructions on safe work habits applicable to employees in most plants. The practical experiences of workers, supervisors, and safety specialists have established the safe practices covered, beginning with a list of general safety regulations and continuing with special sections on machine operation, hand tools, power tools, protective clothing, fire prevention, materials handling and many other related topics.

NORWAY—PAPER AND PULP. Edited by Eivind Flaatten. Published by Norwegian Export Council, Solplassen 1, Oslo, Norway. 8¼x11¼. 80 pages. This new booklet, containing many photographs, features articles by leading experts within the wood processing industry. Some of the topics covered include: technical development and expansion, Norwegian wood pulp industry, production of mechanical pulp, and Norwegian paper and board production. A map showing the location of the Norwegian paper and pulp industries, statistical tables, and a list of Norwegian companies producing pulp, paper and related products are also included.

SAWMILL AND LOGGING RESIDUES IN THE SOUTH CAROLINA PIEDMONT (Station Paper No. 31). By A. S. Todd, Jr. Published by Southeastern Forest Experiment Station, Asheville, N. C. 8 x 10½. 32 pages. This paper reports a U. S. Forest Service study of salvage possibilities in a typical "roofer belt" area of South Carolina. Chipping and barking methods and their relation to transportation problems are explored. With charts, maps, and breakdowns by species, sawmills, logging operations, prices and classes, this study of "waste" wood and the possibilities for using it profitably is one of the most complete that has been made in the South.

EFFECTIVE WATER SAMPLING. (28X-7969). Published by Allis-Chalmers Mfg. Co., 991 S. 70th St., Milwaukee, Wis. 8½ x 11. 4 pages. This new leaflet describes some of the factors involved in obtaining useful samples required for proper control of water conditions in a power house. It tells which samples are important, when samples should be taken, where to obtain them, and how they should be drawn.

WHERE IS YOUR SAFETY ENGINEER? Published by the Society for Advancement of

Management, 74 Fifth Ave., New York 11, N.Y. 5½ x 7½. 30 pages. $1.00. This booklet is a survey on the organizational position of the safety engineer in American industry. Seventeen basic charts are shown that give management and safety people the progress of safety work since the American Society of Safety Engineers was formed in 1911. The booklet is filled with information about the progress of industrial safety programs.

AUTOMATIC pH CONTROL IN WATER AND INDUSTRIAL TREATMENT (Technical Paper No. 55 [reissue]). By Robert T. Sheen. Published by Milton Roy Co., Station E, 1300 E. Mermaid Lane, Philadelphia 18, Pa. This pamphlet is a reprint of a paper by the president of Milton Roy Co. Outlined are several typical systems of automatic pH control in boiler feed water treatment, using air- and motor-operated valves, as well as controlled volume pumps to effect proper addition of chemicals. Several diagrams of actual installations illustrate the bulletin.

ACCIDENT RATES IN THE PULP AND PAPER, PRINTING AND PUBLISHING INDUSTRIES FOR 1952. Published by National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. 5½ x 8½. 60 pages. This booklet contains the 1952 accident experience of all companies that report to the National Safety Council.

PORTS OF THE WORLD. Fourth edition. Published by North America Companies, 1600 Arch St., Philadelphia 1, Pa. 8½ x 11. 47 pages. This illustrated booklet contains the latest available information describing conditions in 135 of the most important ports in all sections of the globe, in addition to valuable information on loss prevention procedures.

Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY *lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.*

Polystyrene Emulsions. Koppers Co. Inc., Chemical Div., Koppers Bldg., Pittsburgh 19, Pa.—Properties and characteristics of four polystyrene emulsions, stable water dispersions of high molecular weight polystyrene, are described in a compact 32-page technical bulletin, C-3-180. It describes the uses and applications of these emulsions in reinforced plastics, water-base coatings, primers and sealers, paper coatings, and textiles. Comprehensive instructions for use of these four emulsions are also contained in the bulletin, with tables listing compatible organic and inorganic pigments.

Shovel-Cranes. Link-Belt Speeder Corp., Advertising Dept., 307 N. Michigan Ave., Chicago 1, Ill.—Catalogue No. 2428, containing 24 pages, describes the 51 Series shovel-cranes. Photographs show the equipment under actual operating conditions. Included in the editorial material is comprehensive data covering the upper machinery, crawler, truck, and wheel-mounted lower mechanisms for each model. The catalogue also includes a detailed section on the operation, features and advantages of "Speed-o-Matic" controls, power-driven hydraulic control system.

Floor Repair Material. Monroe Co., Inc., 10703 Quebec Ave., Cleveland 6, Ohio—Technical Data Bulletin 62-B describes Cryptolite, the new prismatic crystalline mineral recently added to "Swift-Floor" floor resurfacing and repair material.

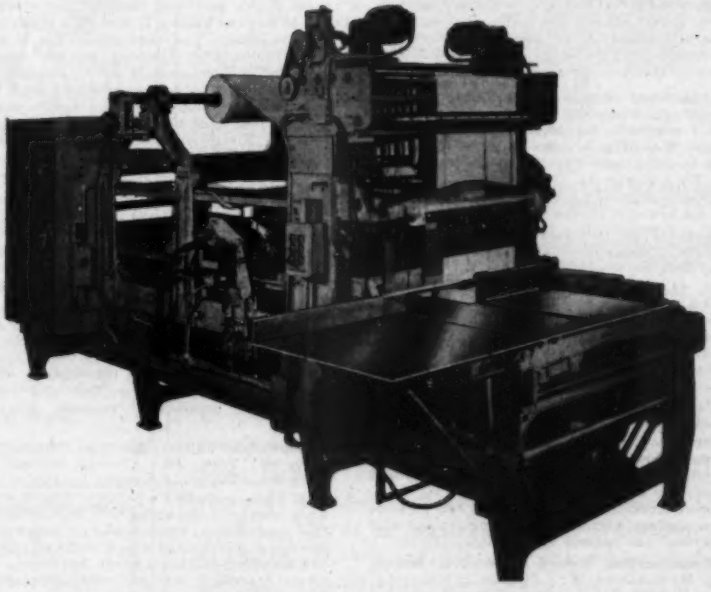
Polyethylene Adhesive. American Resinous Chemicals Corp., 103 Foster St., Peabody, Mass.—Arcco 980-21D, polyethylene adhesive, is described in Technical Data Sheet C-75. Specifications are listed.

Welding (Film). Eutectic Welding Alloys Corp., Technical Information Service, Dept. "P", 172nd St. and Northern Blvd., Flushing 58, N.Y.—A full-color strip film with sound accompaniment, titled "Better, Faster, Cheaper With Welding," has been announced. The 19-minute film features actual case histories of savings in production, maintenance, and salvage resulting from the use of proper welding techniques. The sound accompaniment describes the various jobs pictured and, in addition, explains the advanced welding methods shown on the screen in photos and diagrams.

Chemical Instruments. Consolidated Engineering Corp., 300 North Sierra Madre Villa, Pasadena 15, Calif.—10-page Bulletin CEC-1302 describes Consolidated's comprehensive line of chemical instruments, including the analytical mass spectrometer, isotope-ratio mass spectrometer, electrical computer, and mass spectrometer, dual-purpose mass spectrometer, leak detector, titrilog, micromanometer, electrical computer, and mass spectrometer accessories. One page of the bulletin is devoted to the company's analytical service. Another page lists typical users of Consolidated instruments and describes four services of the company. Some of the electromechanical instruments also manufactured by this company are briefly described and illustrated.

Gear Couplings. Sier-Bath Gear & Pump Co., Inc., 9252 Hudson Blvd., North Bergen, N. J.—16-page Catalogue C4 on flexible gear couplings contains an introduction; an illustrated section on the advantages of these couplings;

Ream Wrapper and Labeler



A fully automatic REAM WRAPPER and LABELER MACHINE which handles sizes ranging from HEAVIER through 23 x 35, bulk 1" to 3", adjustable to customer's requirements.

Larger sizes upon request.

One operator required.

Speed: ten packages per minute.

NEW PROBLEMS **SPECIAL DEVELOPMENTS**

GRISWOLD AND JOHNS

Engineers and Builders of Special Automatic Equipment

111 W. Jackson Blvd., Chicago 4, Illinois

The Paper Industry

Professional and Business Services

Engineers
Industrial Plants • Textile & Paper Mills • Location Studies • Appraisals • Reports • Surveys
J. E. SIRRINE COMPANY
GREENVILLE SOUTH CAROLINA

photographs of typical applications in various industries, including the paper industry; complete specifications on the standard type, mill motor type, vertical shaft type, floating shaft type, and spacer type. Cross-section drawings of the special types are given. The last section of the catalogue presents engineering data.

Centrifugal Pumps. Worthington Corp., Centrifugal Pump Div., Harrison, N. J.—This new 4-page bulletin, consisting of four pages, covers Worthington's line of SESC (Standard End Suction Centrifugal) pumps. Designated as No. W-300-B4, the bulletin includes charts to illustrate the coverage provided by the six types of pumps in the SESC line.

Bleach Plant Instrumentation. Minneapolis-Honeywell Regulator Co., Station 213, Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.—Instrumentation Data Sheet 29.5-1 describes the application of several types of instruments in the solution of measurement and control problems in the bleach plant. Included in this 4-page sheet are a typical application drawing and several installation photographs.

Corrosion Prevention. Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y.—Bulletin 62B, which consists of 4 pages, deals with corrosion prevention with metallized zinc or aluminum. It describes and illustrates the application of 18 basic engineering specifications which provide protection against corrosion. Also illustrated and described are several typical applications.

Reciprocating Rotary Actuators. Bonnot Co., Hydromotor Div., Canton 2, Ohio—12-page Bulletin 21 on "Hydromotors," reciprocating rotary actuators, presents operating advantages, schematic applications, engineering data, construction and operating features. Photographs showing the application of the "Hydromotor" in various industries are included.

Vibration Analysis. International Research & Development Corp., Columbus, Ohio—Model 652 "Vibratron," vibration analysis instrument, is described in a new 4-page booklet. The components of the "Vibratron" are illustrated and described, as are the various applications of this instrument.

Flow Meter. Minneapolis-Honeywell Regulator Co., Station 213, Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.—Instrumentation Data Sheet 10.3-5, containing 4 pages, describes the Potter-Brown electronic flow meter for measurement of fluids over an extremely wide range of temperatures and pressures. The three components of this flow meter—a sensing element, a converter, and an ElectroniK potentiometer—are described.

Tachometers. Bristol Co., Waterbury 20, Conn.—20-page Bulletin No. S1402 describes Bristol's full line of recording and indicating electric tachometers. The instruments described include models for measuring speed of rotation or travel, processing time, speed ratios, sum or difference of speeds, and average of speeds. Featured in the bulletin are the recently announced electronic Dynamaster recording tachometers. Engineering information and complete specifications on magnetos and the various types of magnet drives are given. The bulletin is liberally illustrated with photographs and drawings showing methods of application, reproductions of actual chart records, and dimensions.

Reduction Gears. Elliott Co., Jeanette, Pa.—8-page Bulletin H-19 describes high-speed reduction gears for mechanical drive turbines, including an application guide and design and material specifications. A large photograph of a typical built-in high-speed geared turbine is shown, with an accompanying drawing labeling the component parts of this turbine. Design features of the reduction gears are described.

Steam Accumulator. Foster Wheeler Corp., 165 Broadway, New York 6, N. Y.—8-page Bulletin RA-52-8 describes steam accumulators. Advantages are listed. Graphs show a comparison of steam demand and boiler load with and without the accumulator. Chart from recording pressure gage at the accumulator control valves is shown. Other sections cover the principle of the accumulators, calculating capacity of accumulators, and practical application of accumulator theory.

Valves. Lunkenheimer Co., Box 360-U, Cincinnati 14, Ohio—This 4-page descriptive circular shows sectional views of the complete line of Renewo valves. It describes graphically the dimensions and features of the Renewo line. Included in the circular are detailed views of the iron-bodied Ferrenewo and the bronze Renewo valves in globe and angle full-way and throttling types and in lift checks. The arrangement of the circular is designed to make possible an accurate selection of a valve by merely checking the desired pressure class and the type.

Mass Spectrometer. Consolidated Engineering Corp., 300 N. Sierra Madre Villa, Pasadena 15, Calif.—4-page Bulletin CEC-1824 describes the Model 21-610 mass spectrometer for high-speed process monitoring and control. Diagrams and illustrations are included.

Photoelectric & Electronic Measuring Instruments. Photovolt Corp., 95 Madison Ave., New York 16, N. Y.—4-page Bulletin No. 100 contains brief descriptions of all photo-electric and electronic measuring instruments manufactured by this company. This new edition comprises a number of recently developed items.

Rapid Sand Filter. Hardinge Co., Inc., 240 Arch St., York, Pa.—12-page Bulletin No. 46-A describes the automatic backwash rapid sand filter, including a cutaway drawing, plan view, sectional drawings, and photographs of the sand filter. Applications in paper mills, sewage and industrial waste, and water supply are described and illustrated. Auxiliary equipment described includes circular clarifiers, flocculating equipment, and rectangular clarifiers. Advantages of the automatic backwash filter and a Hardinge bulletin index are listed on the last page.

Industrial Chemicals. Atlas Powder Co., Wilmington 99, Del.—Seven classes of Atlas industrial chemicals — sorbitol, surfactants, mannitol, solid polyester resins, fatty acids, plasticizers, and activated carbons—are described in a new 8-page bulletin. Six drawings, charts and diagrams are included. The bulletin also presents the story of the company's development of industrial chemicals and lists its service representatives.

Hard Rubber Pipe & Fittings. American Hard Rubber Co., 93 Worth St., New York, N.Y.—Bulletin 96-A, consisting of 4 pages, describes "Tempron," new heat and chemical resistant synthetic hard rubber, pipe and fittings. The bulletin gives complete information on pipe and fitting sizes, as well as data covering the physical and electrical properties of "Tempron." It lists many chemical solutions that "Tempron" can handle.

Vertical Sand Pump. Denver Equipment Co., 1400 17th St., Denver, Colo.—How the vertical centrifugal sand pump handles frothy pulps without dilution or continuous operating attention is described in Bulletin P10-B4. Dimensions of the pump are given. A data sheet for the reader to fill out and return to the company for their recommendations is included.

Seamless Mechanical Tubing. Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.—A new bulletin, designed to help the tubing user in determining whether he should use hot finished, cold drawn, or "roto-rocked" seamless mechanical tubing as the basis for his product, is now available. Known as TB-346, it outlines the differences in methods of production, surface finish, tolerances and costs of tubing finished by the three processes.

Adjustable Ramps. Rowe Methods, Inc., 2534 Detroit Ave., Cleveland 13, Ohio—The "Adjust-A-Dock" and "Adjust-A-Truck", adjustable ramps for loading docks, are illustrated and described in a new 4-page brochure. Application photos, photos of main components, engineering drawings, specifications, operating and construction features, and other data are included.

Steel Framing Material. Mult-A-Frame Div., Ainsworth Mfg. Corp., 1471 East Atwater St., Detroit 7, Mich.—This new catalogue contains installation photographs, illustrations and information on the various types and sizes of channel frame and fittings, engineering data charts, how and where to buy and other useful information.

Demineralizer. Penfield Mfg. Co., Inc., 19 High School Ave., Meriden, Conn.—This 2-page catalogue sheet describes the new M-100 mono-column demineralizer. The photograph and schematic diagram on the front of the sheet, combined with the detailed description of parts, sample specifications and performance data on the reverse side, provide a concise and complete resume of all essential information.

Gravity Conveyor. Rapids-Standard Co., Inc., 342 Rapistan Bldg., Dept. A-S, Grand Rapids 2, Mich.—A new single-page bulletin with photos, specifications and prices of Rapistan aluminum frame-steel wheel gravity conveyor also has charts and drawings of the new conveyor, showing load capacities, weight, and construction features of the complete range of sizes available in straight and curve sections.

Boiler Baffles. The Engineer Co., 75 West St., New York 6, N.Y.—A new 4-page bulletin showing how streamlined baffles are applied to boilers of all types has recently been issued. Included in this bulletin are 21 drawings of boilers showing how these baffles are installed in each specific unit to secure cross flow of gases of combustion and tapered gas passes with resultant increase in steam output.

Welding Equipment. A. O. Smith, Welding Products Div., Milwaukee, Wis.—"The Spotlight is on A. O. Smith," a new brochure, gives specifications on all available machines and tells of the many types of welding electrodes and welding accessories available.

SULPHITE MILL ACID PLANTS

Sulphur Burning Plants • Jenssen Two Tower Acid Systems • Gas Coolers—Surface and Spray Type • Jenssen Pressure Acid Systems • Jenssen Auxiliary Process Towers • Recovery Plants—Cooking Acid

SOLUBLE BASE ACID PLANTS
SEMI CHEMICAL PLANTS
JENSSEN SO_2 ABSORPTION SYSTEMS

FOR BLEACH PLANT APPLICATION
SULPHUROUS ACID PREPARATION

G. D. JENSSEN CO., INC.
WATERTOWN, NEW YORK

WESTERN REPRESENTATIVE:
JAMES BRINKLEY COMPANY, Seattle, Washington
FOUNDED 1915

Stadler, Hurter
& Company
CONSULTING ENGINEERS

Specializing since 1923 in all phases of design, modernization and expansion of pulp and paper mills from forest to finished product.

HEAD OFFICE: DRUMMOND BLDG., MONTREAL
New York Office: 76 Beaver Street

use "VEE GRIP" STOCK-PIPE FLANGE

QUICK ASSEMBLY • PERFECT ALIGNMENT • LOW COST • • EASIER CLEANOUTS

Can be adapted to any standard tubing size with minor change in O.D. of face ring.

OVERLY'S, INC. Box 263 NEENAH, WISCONSIN

DISTRIBUTED BY
FABRI-VALVE COMPANY OF AMERICA
PORTLAND 12, OREGON
FELKER BROS. - MARSHFIELD, WISCONSIN
WISCONSIN WIRE WORKS EQUIPMENT CORP. - APPLETON, WISCONSIN

New RESLIN SUCTION BOX COVER

PROVEN BY TEST

..OFFERS THESE FEATURES:

Even distribution of fabric assures EVEN WEARING. Ends of threads contact wire assuring uniform surface to wire. Increased wire life. Many years of trouble free service. Resurfacing reduced to a minimum. Does not absorb water. Doesn't contract or expand. Requires no wet storage or care when machine is down. Easily installed. Greater strength and rigidity. Greater open area.

MAKE YOUR SUCTION BOX COVER A RESLIN AND GAIN ALL THE ADVANTAGES OFFERED BY THIS NEW DEVELOPMENT IN SUCTION BOX COVERS.

WRITE FOR FURTHER INFORMATION

APPLETON WOOD PRODUCTS CO. APPLETON WISCONSIN

1/3 HP MIXER

Stainless Steel Propellor and Shaft. Adjustable Clamp. Heavy Rubber Cord and Plug. Only $37.50

STANDARD ELECTRIC MFG. CO., INC.
WEST BERLIN 74, NEW JERSEY

ENGRAVED ROLLS

Skilled engravers of applicator and embossing rolls for paper and coating industries.

Southeastern Cylinder Engraving Co.

311 EAST 12th St. Box 1816 CHARLOTTE, N. C.

CONFIDENTIAL EMPLOYMENT SERVICE

For paper mills, pulp mills and paper converting plants. Servicing employers seeking executives and executives seeking positions. *We welcome your inquiries.*

CHARLES P. RAYMOND SERVICE, Inc.
Phone: LIberty 2-6547 — 294 Washington St., Boston 8, Mass.

FOR SALE—Eight new, unused, 12 plate bronze vat flat Improved screens for installation in 2 lines of four screens. All accessories including V-belt drives, style B flow boxes and bronze holddown bars, etc. Also Magnus chrome nickel screen plates style E, for above screens. Full specifications on application. Address: Box 561, The Paper Industry.

Have You Seen

our list of books for papermakers? All shipments postpaid. For information write:
The PAPER INDUSTRY
431 S. Dearborn St., Chicago 5, Ill.

WANTED:

LAMINATED BOARD SALESMAN

Long-established board mill located in southeast requires experienced man to market production from recently installed laminator. Should have thorough knowledge of kraft and chip laminated grades. This is an opportunity with a company having excellent reputation and sound personnel policies. Confidences strictly respected.

Address: Box 565
The PAPER INDUSTRY

WANTED:

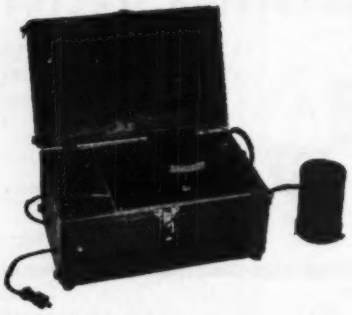
MILL SUPPLY HOUSE or MANUFACTURERS' AGENTS

To sell America's most popular all fabricated valves — complete line, all metals and rubber — in states of Illinois, Indiana, Ohio, Missouri, Iowa, Kentucky and Michigan; all or part.

Address: Box 566
The PAPER INDUSTRY

PHOTOVOLT

Photolectric REFLECTION METER



for accurate measurement of

Brightness and Opacity

of pulp and paper in terms of TAPPI specifications. Also for

Gloss and Color

tests on paper, cardboard and other paper products.

Portable, reliable, rugged, simple to operate

PHOTOVOLT CORP.

95 MADISON AVE. NEW YORK 16, N. Y.

Also: Colorimeters, pH Meters

For Speedy, Controlled Action!

Sandy Hill Quick-Opening **Gate Valve**

Designed Especially for Handling Pulp and Paper Stock and Water Under Low Pressure

★ Quick acting! Can be opened in a fraction of the time required with a screw valve.

★ Slide can be held in any desired position by the clamp.

★ Slide can be removed easily from valve by loosening bolts holding bonnet to body, without taking valve from pipe.

★ Valve can be cleaned readily.

★ Stem end is cut standard pipe thread. No threads on working part of stem to wear out.

Write for illustrated folder

The *Sandy Hill* **IRON & BRASS WORKS**

PAPER MACHINERY SPECIALISTS • HUDSON FALLS, N. Y.

Associated with Canadian Vickers, Ltd., Montreal, Builders of Sandy Hill Designed Machinery in Canada

MARKET QUOTATIONS

RAGS (Domestic)
NEW RAGS

The following are quotations to mills, f.o.b. New York:

No. 1 White Shirt Cuttings	11.50 to 12.00
New Unbleached Muslins	13.50 to 14.00
Fancy Shirt Cuttings	6.75 to 7.00
No. 1 Percales	6.75 to 7.00
No. 1 Washables	3.00 to 3.25
No. 1 Light Silesias	7.00 to 7.25
No. 1 Light Prints	5.75 to 6.00
Light Flannelettes	7.25 to 7.50
Cottonades	3.75 to 4.00
Blue Overalls	6.75 to 7.00
Blue Cheviots	6.75 to 7.00
Canton Flannels, Bleached	10.75 to 11.25
Canton Flannels, Unbleached	10.75 to 11.25
Osnaburg Cuttings	7.75 to 8.00
Underwear Cuttings, Bleached	13.75 to 14.25
Underwear Cuttings, Unbleached	13.75 to 14.25
Khaki Cuttings—	
Sun Tan	7.00 to 7.50
Mixed	3.75 to 4.00
Linen Cuttings—	
American	7.50 to 8.00
White	13.00 to 14.00
Grey	13.00 to 14.00

RAGS (Domestic)
OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

Roofing	per cwt.
No. 1	1.10 to 1.20
No. 2	.85 to .90
No. 3 and 4	.70 to .80
Twos and Blues—	
Repacked	2.25 to 2.50
Thirds and Blues—	
Repacked	2.00 to 2.25
Miscellaneous	1.65 to 1.85
Whites, No. 1—	
Repacked	4.50 to 4.75
Miscellaneous	4.00 to 4.25
White, No. 2—	
Repacked	3.50 to 3.75
Miscellaneous	3.00 to 3.25

RAGS (Foreign)
ex dock New York City
NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)
ex dock New York City
OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING
f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	4.25 to 4.50
Domestic	4.50 to 4.75
Wool Tares—	
Light	5.00 to 5.25
Heavy	5.25 to 5.50
No. 1 Scrap Bagging	3.75 to 4.00
Manila Rope—	
No. 1 large	7.00 to 7.50
No. 1 small	6.00 to 6.50
Sisal Rope—	
No. 1 large	6.00 to 6.25
No. 1 small	5.50 to 5.75
New Burlap Cuttings	6.00 to 6.50
Jute Threads—	
Foreign (Nom.)	6.00 to 6.50
Domestic	6.25 to 6.75
Strings—	
No. 1 sisal	5.25 to 5.50
No. 2 sisal	4.75 to 5.00
Soft jute	5.25 to 5.50
Mixed	3.00 to 3.25

WASTE PAPER
The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

Shavings—	per ton
Hard White Env. Cuts	115.00 to 125.00
Hard White No. 1	90.00 to 95.00
Soft White, one-cut	75.00 to 80.00
Soft White, No. 1	55.00 to 60.00
Coated Soft	40.00 to 45.00
Fly Leaf No. 1	25.00 to 30.00
Fly Leaf, Woody No. 1	25.00 to 30.00
No. 2 Mixed Col. Woody	20.00 to 25.00
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	22.00 to 24.00
Mixed Books	16.00 to 17.00
Ledger Stock—	
No. 1 White	55.00 to 60.00
No. 1 Mixed (Colored)	37.50 to 40.00
Manilas—	
New Env. Cuttings	65.00 to 70.00
New Env. Cuts, One-Cut Extra Manilas	16.00 to 17.00
Manila Tab Cards, Free of Ground Wood	65.00 to 70.00
Colored Tab Cards	45.00 to 50.00
Kraft—	
New Envelope Cuttings	65.00 to 70.00
Tripled Sorted No. 1 100%	42.50 to 45.00
No. 1 Old Assorted	27.50 to 32.50
News—	
White Blank	55.00 to 60.00
Overissue	21.00—
No. 1 Folded	14.00—
Old Corrugated Containers	18.00—
New Jute Corrugated Cuts	21.00—
Mill Wrappers	15.00—
Box Board Chips	12.00—
No. 1 Mixed Paper	11.00—

CHEMICALS
f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.55—
Ground, cwt.	3.85—
Powdered, cwt.	4.70—
Blanc Fixe—	
Pulp, bulk, ton	100.00—
Dry, barrels	105.00—
Bleaching Powder—	
Drums, cwt.	5.00 to 6.00
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	28.00—
Argentine, lb.	22.50 to 23.00
China Clay—	
Domestic Filler	
Bulk (mine) ton	10.50 to 16.00
Domestic Coating	
Bulk (mine) ton	17.00 to 25.00
Imported (ship side)	
Bulk (lump) ton	20.00 to 30.00
Chlorine—	
Tank cars (wks) cwt.	2.93—
Gelatine (silicon), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	33.50—
Litharge, powd. bbl. lb.	.15½ to .16

MARKET QUOTATIONS

Rosin (Gum)—	New York, per 100 lbs.	
E	8.80—	
F	8.80—	
G	8.80—	
WW	9.10—	
Rosin (Wood), carlots, F.O.B. South	6.50—	
Salt Cake—		
Dom. bulk (wks) ton.	19.00 to	23.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	22.00—	
Soda Ash—		
Bulk (works) cwt.	1.45—	
Paper bags, cwt.	1.75—	
Soda (Caustic)—		
Solid drums, cwt.	3.70 to	4.45
Ground and flake, drums, cwt.	4.10 to	4.85
Sodium Silicate—		
60 deg. 55 gal. drums, (works) cwt.	1.60 to	1.70
40 deg. 35 gal. drums, (works), cwt.	1.35 to	1.40
Starch—		
Pearl, 140 lb. bags, cwt.	6.39—	
Pearl, barrels, cwt.	6.39—	
Paper (Sp.) bags, cwt.	6.39—	
Powdered, barrels, cwt.	6.60—	
Sulphur (Crude) (Mine) bulk, long ton	25.50 to	27.50
Talc—		
Dom. 100 lb. bags (mine) ton	25.00 to	28.00
Canadian	35.00 to	45.00
Titanium Dioxide—		
Barium Pig, bbls., lb.	.22½ to	.23
Calcium Pig, bbls., lb.	.22½ to	.23
Zinc Sulphide, bbls., lb.	11.50 to	12.00

WOOD PULP

Quotations on domestic and Canadian wood pulp, dollars per short air dry ton, delivered consuming mills including basic freight allowances, follow:

Bleached Sulphite	140.00—
Bleached Sulphite, Canadian	140.00—
Unbleached Sulphite	120.00—
Unbleached Sulphite, Canadian	120.00—
Bleached Soda	140.00—
Bleached Soda, Canadian	140.00—
Kraft, Bleached	145.00—
Kraft, Bleach., Southern	142.50 to 150.00
Kraft, Bleach., Canadian	145.00 to 150.00
Kraft, Unbleached, Northern	132.50—
Kraft, Unbleached, Southern	95.00 to 105.00
Kraft, Unbleached, Canadian	100.00 to 125.00
Kraft, Semi-Bleached, Southern	140.00—
Sulphite Screenings	72.50—
Sulphate Screenings	67.50—
Groundwood	82.50 to 87.50

Quotations on imported wood pulp, dollars per short ton, on dock American Atlantic ports with varying freight allowances, follow:

Bleached Sulphite, Swedish	140.00—
Bleached Sulphite, Norwegian, freight allowed	140.00—
Bleached Sulphite, Finnish, freight allowed	140.00—
Unbleached Sulphite, Swedish	110.00 to 115.00
Unbleached Sulphite, Finnish, freight allowed	120.00 to 125.00
Kraft, Unbleached, Swedish, freight allowed	105.00 to 110.00
Kraft, Unbleached, Finnish, freight allowed	105.00 to 135.00
Kraft, Bleached, Swedish, on dock	142.50 to 145.00
Kraft, Bleached, Norwegian	

PAPER

Boards—

Prices per ton, delivered, 10 tons or more:

Plain Chip	85.00—
News vat lined chip	97.50—
Filled news	87.50—
Solid news	90.00—
White vat lined chip	135.00—
Chip tube and can stock	100.00—
Single manila lined chip	140.00—
Single jute lined chip	135.00—
Kraft liner	122.50—

White patent coated:

.020	160.00—
.018	162.50—
.016	165.00—

Book Paper—

Coated two sides

70 lb. No. 2 enamel, 25x 4 cases	$17.25
38-500, trimmed 4 sides. Carloads	$16.30
45 lb. enamel, 25x38-500, 4 cases	$13.05
trimmed 4 sides. Carloads	$12.10

Uncoated

55 lb. No. 2 offset, 25x38 4 cases	$14.80
500, trimmed 4 sides. Carloads	$13.85
50 lb. A Grade English Finish, 25x38-500, untrimmed 4 cases	$14.05
Carloads	$13.10
20 lb. envelope, 17x22-500, untrimmed Carloads	$12.40
16 lb. tablet, 17x22-500 Carloads	$11.35

Rag Content Bond—

Extra 100% rag	70.45—
100% rag	62.65—
75% rag	48.15—
50% rag	38.90—
25% rag	31.75—

Rag Content Ledger—

Extra 100% rag	72.65—
100% rag	63.90—
85% rag	52.50—
75% rag	49.40—
50% rag	40.20—
25% rag	33.00—

Sulphite Bond—

Air dry bond (Watermarked)	19.00—
No. 1 bond (M.F. watermarked)	15.00—
No. 2 bond (M.F. watermarked)	14.00—
Plain bond (M.F. unwatermarked)	14.00—

Sulphite Ledger—

No. 1, M.F. watermarked	20.50
No. 2, M.F. watermarked	19.50
Plain, M.F. unwatermarked	19.00

News—	per ton	
Rolls, Standard (Contract)	125.00 to	126.00
Rolls (Spot)	(Nominal)	
Sheets	138.00—	

Tissues (Carlots)—	per ream
White No. 1	1.75—
White No. 2	1.35—
Bleached Anti-Tarnish	2.20—
Colored	2.00—
Anti-Tarnish Kraft	1.65—
Manila	2.00—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.90—
Napkins, full crepe and embossed (12½ lb. to Mshts.) per cs.	.90—
Toilet, Bleached (M shts.) per cs.	9.35—
Toilet, Unbleached (M shts.) per cs.	7.90—

Towels—	per case
Bleached	6.80—
Unbleached	5.90—

Wrappings (Kraft)—	per cwt.
Standard wrapping	8.00—
Butchers, counter rolls	8.50—
Standard bag, mill rolls	7.75—
Shipping sack, mill rolls	8.00—
Gumming, mill rolls	8.25—
Asphalting, mill rolls	8.00—
Envelope, mill rolls	9.50—

TILE

TANKS • SILOS
CHESTS

We are qualified to handle the biggest job you can give us. For example, a job which we recently completed in Florida took 75 carloads of tile.

We give you top-quality service on little jobs too. The installation of a fitting in a Wisconsin bleach tower required the replacement of only three tile — but it received our best workmanship.

It will pay you to investigate Stebbins tile construction as compared with any other type. Prompt service throughout North America.

Complete Design, Installation and Maintenance Service

SEMCO

STEBBINS

Engineering and Manufacturing Company, Watertown, N. Y.

STEBBINS ENGINEERING CORP. — TEXTILE TOWER, SEATTLE, WASH.

CANADIAN STEBBINS ENGR. & MFG. CO. LTD. — CASTLE BLDG., MONTREAL, CANADA

COCHRANE CHEMICAL COMPANY

Specialists in WAXES for the paper and insulating trade

Laminating . . . Paper Coating . . .
Saturating . . . Wax Concentrates . . .
Heat Sealing Waxes . . .
Moisture Vapor-resisting Waxes . . .
Petrolatums . . . Wax Emulsions . . .
Dip-coating (conforming to Army-Navy specifications).
Special blends for paper converting.

COCHRANE CHEMICAL CO.

151 Main Street

Matawan New Jersey

PUT ACTION IN YOUR SAFETY PROGRAM

Add a touch of showmanship to your safety program. Films let you tell your training story with the dramatic impact of pictures . . . action . . . sound. You can cut your safety training in half, give fewer refresher courses and get better results by using training films.

Here are three film sets that will help you arouse and keep alive interest in your safety program. And there is no better way to teach foremen how to be better supervisors.

SPEAKING OF SAFETY

A brand new set of films that will teach your foremen and supervisors the tips they should know about making safety talks, and how to transmit management's ideas and plans. Six 35mm sound slidefilms and leader's manual in an attractive leatherette case.

HUMAN FACTORS IN SAFETY

This is a series of six 35mm sound slidefilms with leader's manual that may be used for an advanced safety course. Each film deals with one aspect of the complex art of handling people. Collectively, the films show how to train workers, how to keep experienced people on their toes and how to win respect, cooperation and loyal support.

SAFETY MANAGEMENT FOR FOREMEN

A set of ten 35mm sound slidefilms—all that is needed for a course in safety fundamentals. The films explain how to organize a safety program, what part the foreman plays in the program and how safety increases production. They also discuss specific safety activities, such as machine guarding, safety inspections, the first aid program, etc. Complete with leader's manual in an attractive leatherette case.

Write for complete information and details to the

NATIONAL SAFETY COUNCIL

425 North Michigan Ave., Chicago 11, Illinois

The Paper Industry Index to Advertisers

When writing them, please mention The PAPER INDUSTRY.

Refer to the Paper and Pulp Mill Catalogue and Engineering Handbook at your mill office, for complete listing of all advertisers' products.

Adams Co., Inc., R. P. 1171
Advertising Council, Inc.
Albany Felt Company, Inc. 1226
Amercoat Corporation
American Car & Foundry Co.
American Cyanamid Co.
Antara Chemicals Div., General Dyestuff Corp.
Appleton Machine Co., The
Appleton Wire Works, Inc.
Appleton Wood Products Co. 1253
Appleton Woolen Mills 1183
Armour and Company 1172
Armstrong Machine Works 1235
Arnold, Hoffman & Co., Inc. 3rd Cover
Asten-Hill Mfg. Co. 2nd Cover

Babcock & Wilcox Co., Tubular Products Division 1167
Bagley & Sewall Co., The 1170
Bailey Meter Co.
Barco Manufacturing Co.
Bauer Bros. Co., The
Beloit Iron Works 1191
Binks Manufacturing Co.
Bird Machine Company 1197
Bowser, Inc.
Bowsher Co., The N. P.

Cameron Machine Co.
Carthage Machine Co. 1248
Chicago Bridge & Iron Company 1168
Classified Advertising 1253
Clinton Foods Inc.
Cochrane Chemical Co. 1255
Corn Products Refining Co. 1178
Cuno Engineering Corp.
Curlator Corporation 1203

DeZurik Shower Company
Diamond Iron Works, Inc.
Downingtown Mfg. Co.
Draper Brothers Company
du Pont de Nemours & Co., E. I. 1176

Eastwood-Nealley Corporation 1200
Egan & Co., Frank W.
Electric Machinery Mfg. Co.
English China Clays Sales Corp. 1248

Fabri-Valve Co. of America 1245
Falk Corporation, The 1173
Federal Fawick Corporation 1166
Felker Bros. Mfg. Co.
Fisher Governor Co.
Fiske Brothers Refining Co., Lubriplate Division
Flexonics Corporation 1199
Fritz Publications, Inc. 1190, 1257

Garlock Packing Co., The 1228
General American Trans. Corp.
General Blower Co.
General Chemical Division, Allied Chemical & Dye Corporation
General Dyestuff Corporation 1225
Gilbert & Nash Company
Goldman Paper Co., G. B.
Goslin-Birmingham Mfg. Co. 1240
Graton & Knight Co. 1227
Griswold and Johns 1251

Hanchett Manufacturing Co. 1249
Hart-Moisture-Meter
Hercules Powder Company
Hooper & Sons Co., Wm. E.
Hubinger Company, The
Hudson-Sharp Machine Company 1247
Humphrey Elevator Company
Hunt Machine Co., Rodney
Huyck & Sons, F. C. 1177

Improved Machinery, Inc. 1169
Industrial Cypress Lumber Co.

Jackson & Church Company
Jeffrey Mfg. Co., The
Jenssen Company Inc., G. D. 1253
Johnson Corporation, The
Jones & Sons Company, E. D. 1162-1163

Kalamazoo Tank & Silo Co. 1245
Kelco Company 1159
Kewanee-Ross Corporation
Kidder Press Company 1239
Koehring-Waterous Ltd.
Kuhns Brothers Company, The

Langston Co., Samuel M.
Layne & Bowler, Inc.
Leeds & Northrup Company 1174
Lewellen Manufacturing Co. 1224
Lindsay Wire Weaving Co., The
Link-Belt Company 1188
Lockport Felt Company
Lodding Engineering Corp. 1229
Lubriplate Div., Fiske Brothers Refining Company
Lunkenheimer Co., The 4th Cover

Magnus Metal Corporation
Manhattan Rubber Division
Mason-Neilan Regulator Co.
Michigan Pipe Company 1234
Michigan Steel Casting Co. 1248
Midvale Company, The 1243
Midwest-Fulton Machine Co., The 1245
Modern Engraving & Machine Co. 1233
Morden Machines Company
Mt. Vernon-Woodberry Mills, Inc. 1164
Murray Mfg. Co., D. J.

Nash Engineering Co., The 1231
National Aluminate Corp. 1160
National Safety Council 1256
National Starch Products, Inc. 1175
Naylor Pipe Company 1242
Newcomb-Detroit Co. 1247
Nichols Engr. & Research Corp.
Nitrogen Division, Allied Chemical & Dye Corporation 1192
Norton Company

(Continued on facing page)

Oakite Products, Inc.
Oilgear Company, The 1181
Oldbury Electro-Chemical Co.
Oliver United Filters, Inc.
Orr Felt & Blanket Co.
Overly's, Inc. 1253

Pandia, Inc. 1198
Paper and Pulp Mill Catalogue 1257
Paper Industry, The 1190
Paper Machinery & Research, Inc.
Paper Makers' & Merchants' Directory of All Nations 1248
Peerless Pump Div., Food Machinery & Chemical Corporation
Perkins & Son, Inc., B. F.
Permutit Company, The
Photovolt Corporation 1254
Poole Foundry & Machine Co. 1247
Powell Valves 1165
Pusey & Jones Corp., The

Raybestos-Manhattan, Inc.
Raymond Service, Inc., Chas. P. 1253
Read Standard Corporation
Red-Ray Mfg. Co., Inc.
Rice Barton Corporation
Rice Barton Research Corp.
Roots-Connersville Blower Div.
Ross Engineering Corp., J. O.

Sandy Hill Iron & Brass Works 1254
Shenango-Penn Mold Company 1185
Shuler & Benninghofen 1180
SKF Industries, Inc. 1236
Smidth & Co., F. L.
Smith Company, S. Morgan
Solvay Process Division, Allied Chemical & Dye Corporation 1184
Southeastern Cylinder Engraving Co. 1253
Stadler, Hurter & Company 1253
Staley Mfg. Co., A. E.
Standard Electric Mfg. Co. 1253
Standard Oil Co. (Indiana) 1258
Stebbins Engineering & Mfg. Co. 1255
Stickle Steam Specialties Co.
Sutherland, Inc.
Sutherland Refiner Corp.
Swenson Evaporator Company 1st Cover

Testing Machines, Inc.
Texas Gulf Sulphur Co.
Titanium Pigment Corporation
Tri-Clover Machine Co.
Turner Halsey Company 1164

Ultra Plating Corporation 1246
U.S.A.—Treasury Dept.

Valley Iron Works Company
Vanderbilt Co., Inc., R. T. 1186

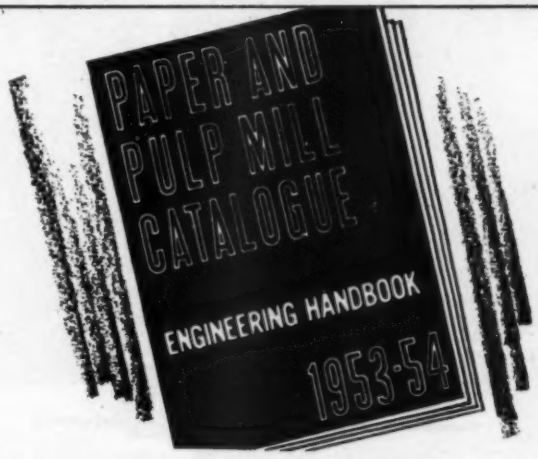
Waterbury & Sons Co., H.
Waterbury Felt Co., The
Weyerhaeuser Timber Co. 1179
Whiting Corporation 1st Cover
Williams-Gray Company
Wisconsin Wire Works
Wolferz Alloy Equipment, E. C. 1182
Wyandotte Chemicals Corporation

Yarnall-Waring Company
Youngstown Welding & Engineering Co., The 1201

Professional & Business Services Section
Sirrine Company, J. E. 1252

You'll find it in the NEW 1953-54

Paper and Pulp Mill Catalogue



1 **Latest Information**
ON MACHINERY, EQUIPMENT, MATERIALS, CHEMICALS

2 **Sources of Supplies . . .**

3 **Vital Facts of the Industry . . .**

3 BOOKS IN ONE:

MANUFACTURERS CATALOGUE SECTION . . . contains pages and catalogue inserts, giving exact and complete data by manufacturers regarding their products as they apply to the industry . . .

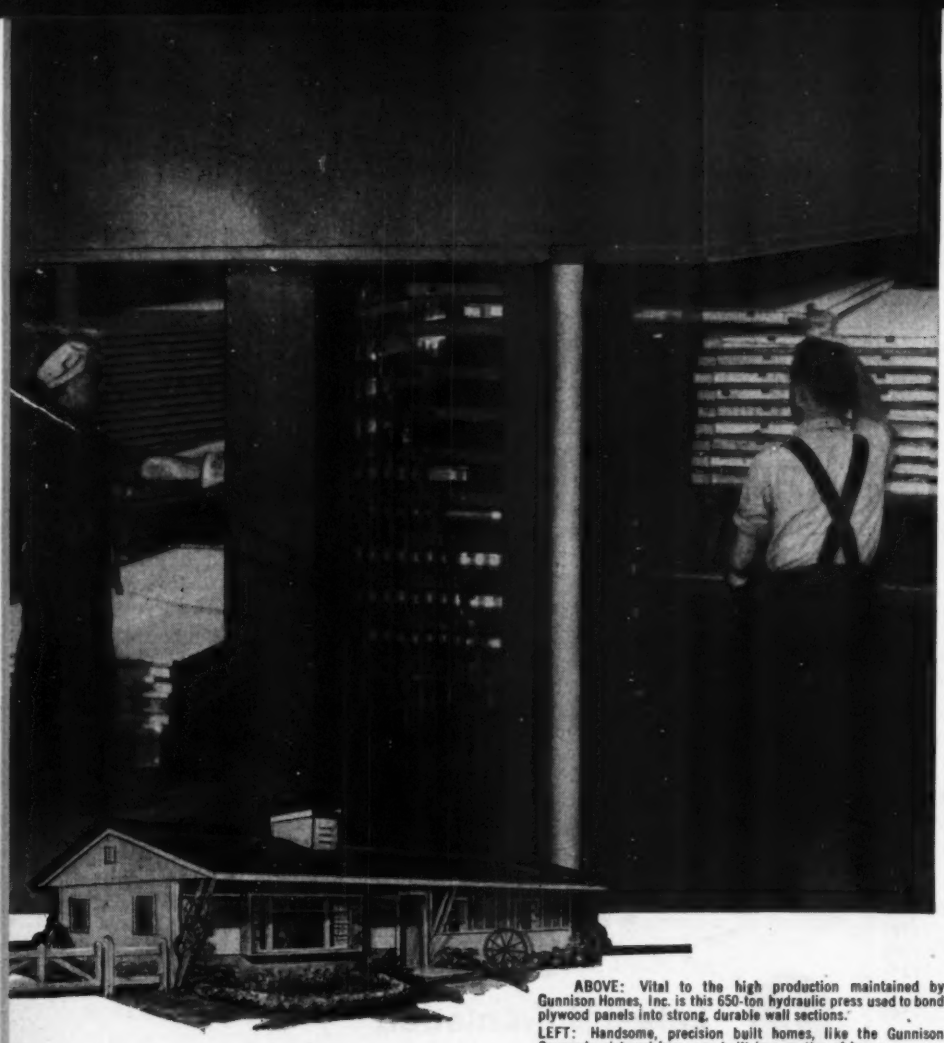
BUYERS SERVICE SECTION . . . is a comprehensive list of more than 4000 products used in the industry, giving a description of their application and the names of manufacturers — 170 pages! . . .

ENGINEERING HANDBOOK . . . is an authoritative compilation of engineering facts of the industry; and provides quick information for the paper and pulp mill executive — 138 pages and more of data, formulas, graphs, charts, and tables.

☆ ☆ ☆ ☆ ☆ ☆

Paper and Pulp Mill Catalogue and The PAPER INDUSTRY are published by

FRITZ PUBLICATIONS, Inc. 431 SOUTH DEARBORN STREET CHICAGO 5, ILLINOIS



ABOVE: Vital to the high production maintained by Gunnison Homes, Inc. is this 650-ton hydraulic press used to bond plywood panels into strong, durable wall sections.

LEFT: Handsome, precision built homes, like the Gunnison Coronado pictured here, are built in a matter of hours.

Answers a pressing need for Gunnison Homes, Inc. . . .

● Gunnison Homes, Inc., situated in New Albany, Indiana, is one of the leaders in the field of manufactured homes. Key to continuous production of precision built homes at the New Albany plant is the 650-ton hydraulic press, shown above, which was installed in 1947. This press processes ten plywood panels every cycle by the combination of heat and pressure . . . a tough job and one requiring reliable hydraulic performance to maintain production schedules.

STANOIL Industrial Oil was installed in the press when it was put into operation six years ago. STANOIL has stood the test of severe operation . . . with no evidence of oil deterioration being found during a recent inspection of the hydraulic system. Operation has been efficient. Minimum make-up oil has been needed to maintain the oil capacity of 450 gallons.

STANOIL
TRADE MARK
Industrial Oil

Find how STANOIL can benefit you by discussing this multi-purpose oil with a Standard lubrication specialist. You can contact him by phoning your local Standard Oil office. Or, write: Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.

What's YOUR problem?

Ralph E. Murnahan, of Standard Oil's Evansville office, is the lubrication specialist who keeps in constant contact with Gunnison Homes to make certain that there is no interruption of operation due to lubrication difficulties.

He is one of many lubrication specialists who make their headquarters in Standard's offices throughout the Midwest. These men have been specially trained in Standard's Lubrication Engineering Schools and, in addition, have a wealth of on-the-job experience.

To obtain the service of the lubrication specialist in your area, you need only call your local Standard Oil office. The lubrication specialist will discuss your lubrication problems with you . . . at no obligation to you, of course. He has a complete line of petroleum products to offer you, including:

SUPERLA Greases—Available in a wide range of consistency grades and in both lime-soap and soda-soap types. SUPERLA Greases cover a wide range of operations. These efficient products are comparable in quality with the highest type of special greases.

STANOLITH Greases—Because these unique lithium soap products possess the heat resistant properties of soda-soap greases and the water resistant properties of lime-soap greases, they offer a solution to lubrication problems caused by the presence of both heat and water.

STANDARD OIL COMPANY **STANDARD** *(Indiana)*

OUR
n?

f Standard
is the lu-
o keeps in
Gunnison
that there
operation
iculties.

lubrication
heir head-
d's offices
est. These
lly trained
tion Engi-
n addition,
ne-job ex-

of the lu-
your area,
your local
e lubrica-
cuss your
th you ...
of course.
of petro-
you, in-

ilable in a
ncy grades
and soda-
ases cover
ons. These
mparable
ghest type

Because
oap prod-
resistant
p greases
properties
they of-
ubrication
ed by the
both heat
r.

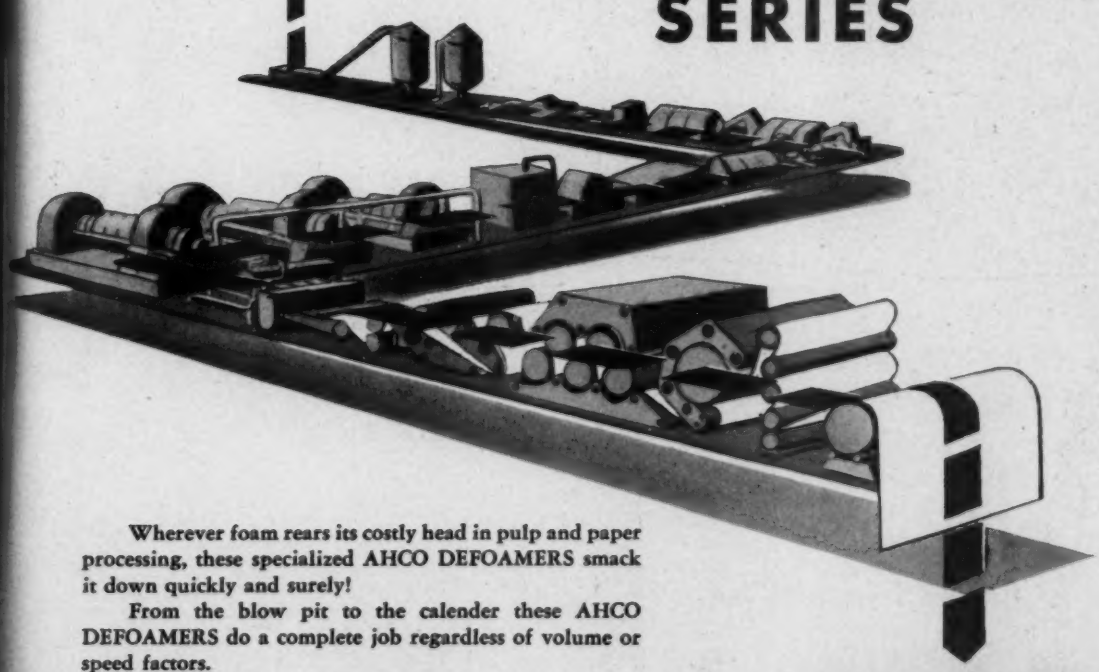
liana)

control FOAM all the way . . .

with the

ECONOMICAL

AHCO DEFOAMER SERIES



Wherever foam rears its costly head in pulp and paper processing, these specialized AHCO DEFOAMERS smack it down quickly and surely!

From the blow pit to the calender these AHCO DEFOAMERS do a complete job regardless of volume or speed factors.

Stop losing time and money to foam . . . make a trial run with economical AHCO DEFOAMERS . . . they do not build up scum or grease in paper machinery . . . won't form oil spots on paper or affect size of paper . . . and are easily dispersed in water.

Promote more perfect sheet formation . . . keep foam and bubble formation under control *all the way!*

EXTRA! use AHCO DEFOAMERS to control foam in paper coating mixes where such coating materials as latex, starch, clay, etc. are used!

ARNOLD, HOFFMAN

Associated with Imperial Chemical Industries, Ltd.
London, England

ARNOLD, HOFFMAN & CO., INCORPORATED • EST. 1815 • PROVIDENCE, R. I.
Offices: Charlotte • Teterboro • Providence
Plants: Charlotte, N. C. • Cincinnati, Ohio • Dighton, Mass.

AHCO DEFOAMER SERIES

AHCO PRODUCTS

Ask your AHCO man for recommendations. Send for technical information.

WHAT TO LOOK FOR

when you buy a Bronze Valve

1 LOOK FOR DESIGN. Use the right valve for the right type of service at the right pressure. There is no such thing as an "all-purpose valve" . . . so don't try to make *one* valve do. *In the complete Lunkenheimer line, there are 125 basic bronze valves — each ideal for a certain type of service. Get your Lunkenheimer Distributor's recommendations.*

2 LOOK FOR OPERATING FEATURES, particularly those that make the valve longer-lasting and easier to use, such as the handwheel. *Lunkenheimer patented Non-Slip® Handwheel assures a firm, cool grip—makes it easy to close the valve tight, reducing wear and eliminating leakage. All Lunkenheimer Bronze Valves have the new Non-Slip Handwheel, along with many other exclusive operating features.*

3 LOOK FOR A LONG-WEARING STEM, since stem-thread wear is one of the most common causes of valve failure. *Lunkenheimer Bronze Valves have Stemalloy® Stems — an exclusive silicon-bronze alloy which completely eliminates stem-thread failure. Not one of the millions of Stemalloy Stems now in service has ever been returned because of thread wear.*

4 LOOK FOR CLOSE-GRAINED BRONZE, the mark of valve quality. Dense bronze not only increases the valve's strength, but makes it much more resistant to corrosion. *Lunkenheimer Bronze Valves are made of original Lunkenheimer alloys recognized by metallurgists as the highest-grade valve bronzes ever developed.*

Remember—The Price Of A Lunkenheimer Valve Gets Smaller And Smaller And Smaller With Each Passing Year Of Dependable Service

ALL POPULAR SIZES of Lunkenheimer Bronze Valves are maintained in stock for prompt delivery. Write for new Circulars 534, 582, and 574 describing typical designs. The Lunkenheimer Co., Box 360S, Cincinnati 14, Ohio.

LUNKENHEIMER QUALITY

BRONZE • IRON • STEEL

LUNKENHEIMER®

THE ONE *Great* NAME IN VALVES

L-154-15

MARCH 1954